FPS 2020

FOD Program Standard 2020

“Trust Through Transparency,

Usability Through Simplicity.”

Welcome to the New Era of FOD Control.

Revisions

1. Original Document (02/16/2016), FMG
2. Grammatical and framework changes (02/26/2017), D Maynes
3. Removal of “FOD Certified” and insert of “FPS Certified”, Resizing of inserted figures (05/29/2017) J. Smythe

Contents

1.0 Introduction

(back to top)

FOD is a serious, continual problem within the aerospace industry. This booklet provides more than 20 years of FOD experience and expertise. The FOD Management Group (FMG) is taking charge of the aerospace industry's lack of FOD program uniformity by creating a certification program that provides an industry-wide FOD standard.

FOD Program Standard 2020 (FPS 2020 or "FPS Certified") certifies organizations through audit by FMG to ensure their FOD Program meets or exceeds the standard outlined in this handbook.

Lowering the impact FOD has on the aerospace industry is the goal of FMG. Through tried and true techniques coupled with innovative new ideas, FMG has created a FOD standard that creates uniformity and transparency throughout the aerospace industry.

2.0 Importance of a Universal FOD Program

(back to top)

Trust though transparency. Products and vehicles that are bought, sold, manufactured, repaired, and operated will all fall under the same universal standard FOD Program. This in turn, creates trust within organizations that conduct business with one another. Trust that the products your organization are buying are coming from an organization that is using the same, solid and robust, FOD program that you are using within your organization.

3.0 Definitions

(back to top)

The acronym FOD is used to define Foreign Object Debris and/or Foreign Object Damage within an aerospace setting.

A foreign object is anything that is not on an engineering drawing. From nuts and bolts to people and animals, anything can be FOD.

An aerospace setting is diverse, from manufacturing plants to flightlines to launch pads and everything in between. If your organization is involved in the aerospace field, it needs to have a viable, definable, benchmarkable, feasible, and adaptable FOD Program.

3.1 Foreign Object Debris (FOD):

Any substance, debris, or article alien to a vehicle or system which has the potential to cause damage or malfunction.

3.2 Foreign Object Damage (FOD):

The result of foreign object debris.

3.3 FOD Controlled Area (FCA):

A sterilized area that is well marked with a solid red painted line. This area is where the concept of FOD control is implemented and maintained.

3.4 Entry Control Point (ECP):

An ECP is the entrance and exit into an FCA that is well marked with a yellow dashed line or yellow dashed lined box.

3.5 Sterilization:

The act of continually keeping an FCA FOD free.

3.6 Part Storage Area (PSA):

A location where parts are stored that contains an FCA.

3.7 Quarantined Part Storage Area (QPSA):

An area that contains an FCA and is specially reserved for quarantined parts. Depending on organizational needs a QPSA might be one or two different areas.

3.7.1 Incoming Quarantine Part Storage Area (iQPSA):

An area where inbound parts are stored before being inspected for containments.

3.7.2 Outbound Quarantine Part Storage Area (oQPSA):

An area where parts that have been inspected, and are ready to be shipped (outbound), are held to ensure they do not become contaminated before shipment to a customer.

iQPSA and oQPSA cannot be the same area and need to be behind lock and key.

4.0 Cost of FOD

(back to top)

The cost of FOD can be as small as a few minutes of man-hours spent looking for an item and as extreme as people losing their lives.

The goal of any FPS 2020 FOD Program is to reduce and eliminate FOD contributing sources. Thereby, creating a safe environment where aerospace products can be produced, repaired, maintained, and operated while maintaining a high FOD Program standard.

5.0 The Tenants of a FPS 2020 Certified Program

(back to top)

5.1 Viable:

A FOD program needs to be successful. It needs to provide the customer with a product that is FOD free. True viability comes from a program that is robust and well managed.

5.2 Definable:

Everyone within a FPS Certified program needs to have a clear understanding of what the program means to them, their organization, and the industry. A successful FOD program is easily defined by everyone within the organization. A program that is too complex or convoluted makes a FOD Program unrealistic, and therefore, not viable.

5.3 Benchmarkable:

A strong program will have metrics built in that provide the FOD Program Manager with insight into how effective or ineffective their current program is performing. This will, in turn, allow a FOD program to better fit the needs of an organization though metrics-based insight.

5.4 Feasible:

A program that is impossible to remember or conduct with ease is useless. Creating a program that is easily understood and utilized is a program that will be successful. Always remember that a successful program needs to be memorized. Therefore, the less you put into the program the more you will get out of the program. Simplicity should be at the forefront of any FOD Program planning.

5.5 Adaptable:

Adaptability means the program needs to able to change or flow with your current organizational needs. Adaptability allows for a sustainability. When changes occur within an organization, the FOD program needs to be a part of that change. If your program is unable to change, then it is no longer viable, and therefore, unsuccessful.

6.0 FOD Controlled Area (FCA)

(back to top)

A FOD Controlled Area (FCA) is an area that needs to be FOD free. The FCA is where a FOD control programs principles are applied.

An FCA is outlined by a painted red line that is clearly visible and well maintained to ensure employee compliance of the boundary. An FCA line cannot be crossed if a FOD program is to remain viable. ECP's provide entrance and exit into the FCA. The FCA is, literally and figuratively, the line that FOD cannot cross.

Anyone who enters the FCA needs to be aware of their FOD responsibilities and must have some type of training/briefing before entering. The FOD Manager is responsible to ensure everyone who enters the FCA is properly trained/briefed. In large organizations, the FOD Manager might not know when people are hired or when guests visit the FCA. Because of this issue, the responsibility of FOD training and briefing can be delegated to Supervisors and FOD Advisors to ensure training is conducted in a timely manner. Ultimately though, the responsibility of training is the FOD Manager's.

Anything that requires to be FOD free needs to stay within the confines of an FCA. It does not matter if the part, plane, etc. is currently being worked on or if it is in storage, the area where the part/vehicle is located must be a designated FCA.

If a part/vehicle leaves an FCA, a FOD inspection must be accomplished by authorized personnel prior to the part returning to the FCA. The FOD manager will make the determination as to who is authorized to make this inspection. This inspection

usually falls with quality assurance. The inspection needs to be documented after the inspection is complete and it is determined that the part, plane, etc. is FOD free.

The FCA is the FOD epicenter of a FOD control program, and it should be treated as such. When one enters the FCA they should be FOD aware. This is why it is so vital for the FCA to be clearly marked. These markings help the employee to remember that they are stepping into a sterilized environment and that great care needs to be taken when they are inside the FCA.

Lastly, an FCA can be anywhere. They are not only designated to a manufacturing/hangar floors. They can be in a delivery truck, in a part storage area, anywhere a part, plane, etc. is located.

7.0 Entry Control Points (ECP)

(back to top)

ECP's provide a great way to control how people and vehicles enter and exit an FCA. This control helps to give transparency into where outside FOD is originating. This information can then be used to mitigate or eliminate outside factors that are contributing to FOD issues.

ECP's should be placed strategically to maximize usability, but placed sparingly to minimize the way outside factors are being introduced into the FOD controlled area.

An ECP needs to be easily identified. We recommend an ECP be identified with a painted yellow dashed box or a yellow dashed painted line through and FCA's red

line. The color yellow helps to promote employee caution when entering. The dashed box or dashed line is a clear visible marker when it contrasts with the solid red FCA line.

ECP's are only as effective as those who use them, therefore, it is everyone's responsibility to ensure that ECP's are being utilized. Creating a culture of ECP usage will be difficult at first, but the concept will catch on quickly if ECP's are well placed.

8.0 Walkways

(back to top)

Walkways are useful in a production/manufacturing setting. They are located inside and FCA and control movement through the FCA. They are designated with a solid yellow line on either side of the walkway. Controlling movement about a production/manufacturing floor is imperative to ensuring, not only safety, but FOD control.

Walkways keep those who are not directly involved in a process out of the area. This, in turn, reduces the number of variables of FOD origination. This reduction in variables helps to keep FOD from being introduced and it helps with FOD investigations. The less variables there are to investigate the easier it will be to find a root cause for an incident.

9.0 Part Storage Area (PSA)

(back to top)

A PSA is a designated area where parts are stored. This area needs to be an FCA that is only accessible to authorized individuals. These parts need to be

safeguarded against FOD introduction and part cannibalization. It is essential that the part maintains the same integrity it came in with when it is released.

A PSA needs to be treated like benchstock in that it is only accessible to authorized personnel. When a part is needed and not available in benchstock, it is tempting for employees to cannibalize other parts to get what they need.

Cannibalization can be useful when done properly (with supervisor approval and the part that is cannibalized is put on order). But when done without approval, the results can be catastrophic. Questions will be raised as to where the cannibalized parts are, ultimately leading to an investigation and even placing the cannibalized part in quarantine. Again, transparency is the goal with any FOD program. Total part control is crucial to maintaining program transparency.

Because of this transparency, it is imperative that there is some type of sign in/sign out documentation for the PSA. This documentation needs to identify who brought the part to the PSA, who accepted the part, time/date, any remarks, who released the part, who accepted the part, time/date, and any remarks.

A PSA needs to be safeguarded and transparent to be effective.

10.0 Quarantined Part Storage Area (QPSA)

(back to top)

A QPSA is separate from a PSA. This is where delivered parts are stored before they have been inspected for FOD and other defects. It is also where parts are stored after they have been inspected before they ship to the customer. A QPSA is identical to

the PSA except that it is for inbound and outbound parts. This means that the same rules that apply to the PSA apply to the QPSA.

In most manufacturing environments, there is a need for two (2) types of QPSA's, inbound (iQPSA) and outbound (oQPSA). Both require the same PSA rules. The only difference is that the oQPSA is for completed parts awaiting shipping that cannot risk FOD contamination. While the iQPSA is for delivered parts that may be FOD contaminated and require quality assurance inspection prior to being released to the owning organization. Because of this difference, the iQPSA and oQPSA must be physically separated to ensure cross contamination does not occur.

The iQPSA can also be used when a FOD incident occurs and it is deemed a part needs to be quarantined due to an ongoing investigation.

QPSA parts should not sit for long periods. The QPSA is meant as a transitional storage. Once a part has been inspected it should then be placed in the PSA or released out to where it is needed.

Ideally, QPSA's should be located as close to an exit as possible. iQPSA parts might contain FOD, and the less they are moved prior to a quality assurance inspection, the better to ensure cross contamination does not occur. oQPSA parts should be placed next to outbound shipping areas to ensure they do not become FOD contaminated prior to shipping.

11.0 Placement Area

(back to top)

Placement areas are where commonly used tools and ground equipment are kept. These are large item such as ladders and nitrogen carts. These items are not checked out to an individual, they are communal.

Because of their size, it would be unrealistic for them to be moved to and from a tool shop, therefore they are placed in a placement area when not in use. A placement area is centrally located for ease of use.

Once a placement area tool is no longer needed it needs to be returned to the placement area.

The FOD Manager along with the floor supervisor will find the best location for a designated placement area. The area must be marked so that it is easily seen by employees. This is generally done with a solid yellow line outlining the placement area.

Because of the communal nature of placement area tools, there needs to be a designated person(s) identified to ensure the tools are in good working order. This can be done several ways. A sign-off sheet can be located on each tool, and before the tool is used, it needs to be signed by the individual who used it. This signature verifies that the individual checked the tool for issues and deemed it to be serviceable. A sign-off sheet allows management to know who has been using the tool if an issue arises.

Another way is to assign responsibilities to tool serviceability. This assignment should be given to individual(s) who are around the tools and have a clear understanding of what is considered serviceable and what is not.

Communal tools need accountability for a FOD Program's success. Nuts and bolts can wear and fall off these tools becoming a FOD hazard. It is imperative that communal tools are being inspected regularly to ensure that they do not produce FOD.

12.0 Sterilization

(back to top)

When you bring something into an FCA, it needs to leave the FCA. Tools, hardware, etc. This is the definition Sterilization. Sterilization is an underused term in FOD Control but it is the best way to ensure that FOD stays outside an FCA. Sterilization is nothing more than vigilance. Constantly looking around for FOD and FOD related issues, then quickly rectifying them is paramount to a good FOD sterilization culture.

13.0 FOD Manager

(back to top)

A FOD Manager does not need to be a full-time position within an organization. It does, however, need to be a position within an organization. Any successful FOD program needs to have a focal point. It needs to have a leader. It needs to have someone that is being held responsible for the program's successes and failures to ensure its continued viability.

For any FOD program to be successful, organizational leadership needs to understand the importance of a robust FOD program. They need to understand that there will be certain trade-offs in supporting a FOD program. The person they choose to oversee the program needs to have a certain level of disconnect from production to be successful. If a FOD Program is tied to production values, it will be destined to become nothing more than a shell of a program.

By its very nature, a FOD program will create certain blocks towards production values. The technique is to find a balance. A balance between sound FOD procedures and the push of production. FOD checks will slow production, but a good FOD Manager will be able to mitigate these hurdles so as not to slow production to a point where the FOD Program gets in the way.

Keeping FOD control and production in balance is the goal of the FOD Manager.

13.1 Awareness:

A FOD Manager's name and picture needs to be displayed in employee collection points or other prominent areas, such as break rooms, to ensure their name and identity is well known throughout the organization.

13.2 Responsibilities:

- Be available to all employees.
- Ensure FOD prevention is part of an organization's operating procedure.

- Develop procedures to document and perform spot checks of selected areas weekly.
- Be involved in each FOD investigation and ensure corrective actions are being developed and implemented.
- Document and track employee FOD awareness training.
- Ensure areas such as FCA's, ECP's, FOD containers and other FOD areas remain well marked and are being utilized.
- Keep the FOD Program simple and easily understood.
- Remember that a FOD Program is a fluid program and that what worked in the past might now work in the future, stay vigilant to changes that are needed.
- Work with production to ensure the FOD Program is not too cumbersome.
- Create incentives and contests to keep employees engaged in the FOD Program.

13.3 Employee Training Material Requirements:

- Overview of the FOD Program
- Causes and principal contributing factors of FOD
- Consequences of ignoring FOD, and incentives of preventing FOD

- Practicing “clean-as-you-go” work habits, and the general cleanliness and inspection standards of work areas
- Proper care, use, and stowage of material and component/equipment used
- Control of debris in the performance of work assignments
- Control over personal items and equipment
- Proper control/accountability and care of tools and hardware
- Requirements and procedures for regular inspection and cleaning of work areas
- How to report FOD incidents or potential incidents
- Continual vigilance for potential sources of foreign objects
- FOD detection procedures, including the proper use of detection technologies (if applicable)
- FOD removal procedures

13.4 FOD Prevention Committee:

A FOD Manager needs to have a committee of FOD Advisors who act as “assistants” to the FOD Manager. These Advisors will be assigned to strategic areas where FOD has been shown to be an issue, or where it is likely to occur. This will lessen the burden of the FOD Managers responsibilities, empower employees to have greater FOD responsibilities, and it will keep multiple eyes on problem areas.

The FOD Prevention Committee will have regular monthly meetings. These meetings will identify negative trends and develop action plans to resolve them. Meetings should be used to recognize personnel making significant contributions to FOD prevention (e.g. golden bolt program, FOD poster contests, or other locally developed FOD recognition programs).

13.5 Employee Empowerment Programs:

13.5.1 Golden Bolt:

The purpose of this program is to "litmus test" your FOD program. Because this program requires FOD to be purposefully placed, the FOD Manager needs to be the focal point for such a program.

Think Easter egg hunt with the Golden Bolt Program.

Some type of regularly used hardware (usually painted gold) is placed where a FOD walk or sweep should find it. If FOD inspections are being properly accomplished, the bolt will be found. The bolt should only be placed for a short time so that it does not, itself, become FOD.

If the bolt is found, the employee is rewarded with whatever the organization deems appropriate. If it is not found, those responsible for the area where the bolt was placed should be given further FOD training.

The Golden Bolt Program can be a powerful tool in the FOD Managers toolbox, but it should be used with care to prevent the bolt from becoming FOD.

13.5.2 FOD Poster Contests:

Everyone likes contests, and the FOD Poster Contest is a great way to get employees involved in the FOD program. It also helps to keep FOD control on their minds.

The concept is as simple as it sounds. The FOD Manager organizes a FOD Poster Contest and attempts to get as many entries as possible. Several copies of the winning poster should be placed around the organization to promote employee interest.

This concept is not just for posters it can be used for tee-shirt designs and other areas that will receive high visibility.

13.5.3 FOD Finder of the Month:

Employees find FOD constantly, so why not promote their diligence? FOD Finder of the Month is simple yet effective. The criteria can range from the most FOD found to the most exotic FOD found and everything in between. The recognized employee should be prominently displayed with a picture of the FOD found to keep employee focus on FOD.

An issue can arise from such a program though. Employees might start making/manufacturing FOD to win the award. The best way to counteract this mentality is to keep the reward low. Example: If the prize is a day off from work, employees will be tempted to make/manufacture FOD in order to win the reward. Therefore, keep the reward low, such as recognition or something simple. Remember the goal is to keep FOD control on the minds of your employees, not to give extravagant rewards.

13.6 FOD Reporting:

Employees need an easy and reliable way of reporting FOD issues. This can be done in several ways (reporting to a supervisor, FOD report paperwork, direct reporting to FOD Advisors or the FOD Manager). An organization has the responsibility to find what works best for them when it comes to FOD reporting. The only requirement is that there is a way for employees to report FOD related issues effectively and efficiently.

An organization must make every attempt to determine the root cause of FOD related incidents.

FOD incidents are classified as preventable and non-preventable. Incidents are considered preventable except those caused by natural environment or wildlife. This includes hail, ice, animals, insects, sand, and birds. All FOD incidents will be reported to the FOD Manager no later than 24 hours after the incident has occurred.

13.7 Sustainability Through Flexibility:

A strong FOD program is a fluid program. It is imperative for a FOD Manager to continually look for cracks within the current FOD program. Cracks include, new suppliers, new floor configurations, new flightline configurations, etc. Whenever something changes in an environment that requires a FOD program, FOD awareness needs to be a part of that change.

A FOD Program will be unsuccessful if it cannot change with organizational changes. Keeping a FOD program up-to-date is not only imperative, it is essential for continued program success.

13.8 Lastly:

A good FOD Manager is one that can balance FOD control and production values effectively. Simplicity is the key to any good FOD program. Remember less is more. The less invasive, convoluted, and complex a FOD program is, the better the FOD program will work for all involved.

Finally, continually look to improve the program. A good FOD program moves and changes with the organization. Keep the program fresh and interesting. FOD is serious, but a FOD Program doesn't have to be mundane. Keep employees engaged and you will see positive results.

14.0 Training

(back to top)

14.1 Organizational FOD Handbook:

All employees need to have, or have accessibility to, the current revision of the FOD handbook. This keeps the program transparent to all involved and will help to answer employee questions.

When changes are made to the FOD program, the FOD handbook needs to reflect these changes with revisions.

14.2 Assessment of Employees:

An initial FOD assessment shall be conducted and passed before an employee can enter a FCA unsupervised. Prior to an assessment, the employee should be given a FOD handbook that outlines the organizations FOD program and the nuances that are contained within their program. The assessment needs to be a pass/fail type that shows where the employee might need further guidance.

14.3 Reassessments of Employees:

Annual written assessments need to be administered to ensure employees are up-to-date with current FOD processes and procedures. Completed assessments need to be kept in an employee's file to ensure that, if a problem does occur, there is proof that the employee did take and pass the

assessment. This annual requirement also helps to reinforce the importance of FOD and the employee's role in a successful FOD program.

14.4 Tracking Employee Training and Documenting:

Tracking and documenting an employee's FOD training is just as critical as the training itself. An organization needs to be able to show, at a moment's notice, who is FOD trained and who is not. Who is due for an annual training and who is not.

It is the FOD Manager's responsibility to ensure that all employees within the organization are up-to-date on their FOD training. In larger organizations, this responsibility can be delegated to Supervisors and FOD Advisors. Past assessments are kept just in case future problems arise with the employee.

15.0 Organizational Control

(back to top)

A successful FOD Program is dependent upon organizational control of its tool and hardware programs. Total organizational tool and hardware control must be developed, maintained, and enforced for a FOD Program to be viable.

15.1 Development:

Great care must be taken when developing organizational control of these vital programs. Tool and hardware loss make up a large part of FOD related issues. Control of these issues is imperative for any organization.

15.2 Maintenance:

Organizational needs and culture can change, and therefore, its tool and hardware control programs must be able to change with organizational needs. Program maintenance meetings should occur on a regular basis. The frequency which these meetings occur are based upon organizational needs, but at the least, annual meetings should be scheduled to ensure that the program is meeting the needs of an organization.

15.3 Enforcement:

Meetings and operating procedures can be developed, but if the program is not enforced, the program is worthless. Periodic self-audits need to be performed to ensure the programs are being used and used properly.

An audit should consist of management ensuring that tools and hardware are being dispensed and returned properly. An example would be a manager going to the tool shop, looking up a tool that is checked-out, then easily finding the location of the checked-out tool. If a program is running properly this should be a quick exercise, if the program is flawed or is being operated improperly, it will be a difficult task.

Periodic inspections are vital in ensuring a program is operating as it should. These inspections should be documented. Any issues that arise from these inspections should be resolved quickly to ensure that they do not become larger problems.

Total organizational control over tool and hardware programs are imperative to a successful FOD Program. For an organization to receive an FPS 2020 certification, it must have total control over its tool and hardware programs.

15.4 Tool Control: (back to top)

Tool control can come in many forms. Shadowed tool boxes, etched tools with a location or personal identification, a manned tool shop, a personal chit system, etc.

A “tool” in a FOD Program is defined as anything that is not on an engineering drawing for a part or vehicle. Examples would be traditional tools such as ratchets, screwdrivers, etc. down to untraditional tools such as rags, paper (forms, planners, etc.), pencils, etc. Anything that is not a part of the vehicle or part is a “tool’ and needs to be controlled.

Tools brought into an FCA either need to be taken out of the FCA when not in use or locked in a toolbox or some other fashion to ensure they do not become lost.

Unattended tools that are left on workbenches, toolboxes, etc. are considered a FOD hazard. They are no longer being accounted for and can be lost or picked up by another employee which can cause a lost tool issue.

Tools that an employee signs for needs to always be in their control. An organization can help employee tool control by issuing small locking toolboxes

when an employee checks out tools. This prevents “picking” from other employees and keeps tool accountability with the individual who checked the tools out. At the end of a shift, all tools and toolboxes must be returned to ensure that everything is accounted for before the employee leaves for the day.

Discarding easily removable pocket clips from tools prior to placement in tool kits helps to prevent lost tool issues. Tools should never be disassembled or damage tools for the purpose of removing clips, rubber switch guards, etc.

15.4.1 Personal Tools

Personal tools that are not accountable through the tool control program are a FOD danger and should never be used in an aerospace environment. Because of lack of accountability, a personal tool can become lost without organizational knowledge. This lack of accountability be disastrous.

If an organization deems it necessary for employees to use their own tools, an accountability program must be established to ensure tools are not being lost. One way is to have the employees check out their personal tools and return them to a tool shop. This will, at least, give the organization insight into personal tool control. It is incredibly dangerous to have employees bring in their own tools without some type of accountability.

For an organization to receive an FPS 2020 certification, it must have total control over its personal tool program. The best way to circumnavigate this issue is to not let any personal tools into an organization.

15.4.2 Lost Tools

Lost tools must be reported immediately to a supervisor. The supervisor and employee who lost the tool will attempt to find the tool before involving the FOD Manager. If the tool is not found, the part or vehicle that was being worked on needs to be quarantined until the tool has been found or it has been determined that the tool cannot be found and is not a FOD hazard. The FOD Manager is the only authorized person to make such a determination.

Regardless of the outcome, a root cause analysis is required to be performed and an action plan needs to be developed. An action plan can be as simple as a letter in the offending employees file, or as extreme as the FOD Manager determines necessary to ensure continual FOD safety.

Proper tool control is imperative to a FOD Program. Organizational accountability is necessary for proper tool control. The way tool control is handled is up to the organization. For an FPS 2020 certification, the organization must be able to prove that they know where every tool is located at any time.

15.5 Hardware Control:

Safetywire, nuts, bolts, cotterpins, etc. are all potential FOD and need to be tightly controlled. Prevention of hoarding or “scrounging” (where employees hold onto extra hardware for a “just-in-case situation”) creates a lack of traceability, and therefore, a lack of effectiveness in any FOD Program.

Employees should never be allowed to “pick” or take their own benchstock or hardware. This creates an atmosphere where a lack of control is a danger to a FOD program.

Benchstock storage should be located in such a manner that only authorized employees can enter and disperse hardware. Computer systems or a receipt system needs be used to create a log of who, what, when, how many and by whom the hardware was given.

15.5.1 Personal Lockers

Personal lockers are a perfect place for hardware hoarding. Ideally, lockers will have a mesh door instead of a traditional solid door for easy visibility into what is contained within the locker. To ensure hoarding is not taking place, random locker inspections must be conducted on a regular basis by the FOD Manager. Hoarding happens quickly and a lapse in regular locker inspections can prove dangerous to any FOD Program.

For an organization to receive an FPS 2020 certification, it must have and prove, total control over its hardware program.

16.0 Different FOD Control Areas

(back to top)

Many organizations have adopted the three levels of FOD control approach. These three areas are FOD Awareness Area, FOD Control Area, and FOD Critical Zone. Although this technique was put together with the best of intentions, it only serves to convolute a FOD Program. The reason is simple, if you make everything a FOD area then nothing is a FOD area. What this means is, if you make FOD control everywhere, then employees tend to be less vigilant when they are in a critical area. The critical nature of FOD control is lost because everywhere is FOD controlled.

Keep a FOD Program simple. When someone enters an FCA that is when they need to be vigilant. These different zones only water down FOD control. When someone enters a FOD controlled area they should know. When they leave, they should know. There is no reason to have varying degrees of FOD control. It is either an FCA or it is not.

If the three levels of FOD approach is working for your organization, then keep it, but keep in mind that this concept is convoluting and may be detrimental to an organizations FOD Program. The responsibility of finding what works best for an organizations FOD Program is the FOD Managers.

17.0 FOD Walks/FOD Sweeps

(back to top)

A FOD walk or sweep is quite simple, yet extremely effective. FOD walks are mandatory to remove FOD from ramps, runways, low usage taxiways, manufacturing floors, etc. Vacuums, magnetic sweepers, and sweeping with a broom are highly encouraged to supplement FOD walks and sweeps.

For flightline environments, extreme care should be taken where jet engines operate. This can be parking spots, engine run pads, taxiways, etc. Anywhere a jet engine operates is a prime spot for FOD damage and these areas need to be swept before and after any jet engine operation.

Grounding points, mooring points or other places that can trap FOD need to be kept clean of debris and should be a high interest item for FOD walks.

FOD containment bins should be strategically placed, so that when FOD is found, it can be quickly disposed of. No one wants to walk around with a hand full of FOD for very long. To ensure that your FOD walks/sweeps are effective, it is vital that there are receptacles nearby for FOD to be disposed of easily.

18.0 Containment Bins/FOD Pouches

(back to top)

A successful FOD Program creates and sustains an environment that allows employees to easily pick up, and dispose of FOD. Containment bins should be brightly colored and easily accessible.

FOD Pouches are worn by employees and allow for an employee to easily dispose of FOD. They are usually connected through a belt and are just big enough to be effective. A pouch that is too big is cumbersome and will not be used. Conversely, a pouch that is too small will be inefficient and will not be used. Finding the right size is imperative to usage.

A bin can be anything, but generally speaking, a containment bin is best when it is metallic with a lid. Metallic because it will be less susceptible to crack and enclosed with an attached lid to prevent what is in the bin from falling out. The bin should be brightly colored and have the word FOD painted in contrasting colors. An example would be a yellow bin with FOD painted in black.

Containment bins and pouches should be emptied daily or when full, whichever comes first. They should also be checked for damage. If these objects are not properly maintained they will, in fact, become a FOD hazard themselves. Holes and cracks in containment bins and pouches will undermine even the most robust FOD program. The FOD Manager is responsible for containment bin serviceability, while the wearer of a FOD pouch is responsible for the pouches serviceability.

19.0 Different Environments

(back to top)

19.1 Flightline:

Flightline environments are fraught with FOD issues. Because a flightline is outside, it is susceptible to an uncontrolled environment which can cause

havoc to any well prepared FOD program. Winds, ice, snow, trash blowing, concrete erosion, etc.

A flightline requires constant attention by all who use it. A good practice of flightline employees is to keep their heads down and looking at the ground whenever possible. This practice does sound counterintuitive, but when an employee is looking at the ground when walking they have a better chance of seeing FOD.

Even after the a FOD walk or sweep, because of the numerous outside factors of a flightline, FOD can be introduced right after. Therefore, constantly looking down helps to find FOD that was either overlooked or introduced after a FOD walk/sweep.

19.1.1 Flighline FOD Walk/Sweep

In a flightline environment, a FOD walk or sweep consists of several people walking closely together in a shoulder to shoulder line looking at the ground for any debris/foreign objects. This should be done where feasible. Parking spaces and lesser used taxiways are prime locations for a FOD walk.

A sweep is simply one or more people conducting a last look around prior to engine start or before an aircraft returns. Walking around the parking space looking for debris is a last chance assurance that the space is FOD free.

Whenever any work is performed in a flightline environment from refueling to panel removal to baggage handling, a FOD sweep should always be the last action performed before leaving the area.

19.1.2 Tire Check

Vehicle tires are a continual place for FOD introduction into an FCA. Tire tread picks up FOD easily and this FOD needs to be removed prior to entering an FCA.

Vehicle operators will stop and perform a visual FOD inspection on all equipment and tires prior to entering flight line areas. A tire check line will be painted where the check is to be performed. This line must be located prior to entering an FCA. A sign at the FOD checkpoint also helps to reaffirm that vehicle operators understand that a tire check is required.

Although anyone in the vehicle can perform the tire check, the person responsible to ensure a tire check is performed is the vehicle operator.

The vehicle will stop at the line. A tire check will be accomplished to ensure all rocks and other debris are removed from the tires. Once the initial check is performed, the driver will then drive forward enough so that the bottom of the tire from the

previous check is now visible. Another tire check is performed and then the vehicle is allowed into the FCA.

Because a roll over check is required, the tire check line will be far enough back from an ECP so that there is room to perform the roll over check.

Anyone who can drive in an FCA needs to have proper tire check instruction and understanding prior to being allowed to drive in an FCA.

19.1.3 Magnetic Bars

Use of magnetic bars on vehicles is optional. If used, the magnetic bars will be located on the front of a vehicle. It needs to be low enough to be effective, but not so low that it will touch the ground when the vehicle goes over bumps. Magnetic bars will be inspected and made FOD free prior to the beginning of each shift.

Magnetic bars can prove to be more of a hindrance than a help with FOD control though. First, if they do pick up FOD, it is impossible to know where the FOD came from which makes an investigation of the FOD's source impossible. Second, if the vehicle comes to an abrupt stop, or hits a bump, it can shake the FOD that was on the bar off, creating a secondary FOD hazard.

If a magnetic bar is used, it requires attention and precautions should be taken to ensure that it does not become a way for FOD to travel from one location to another.

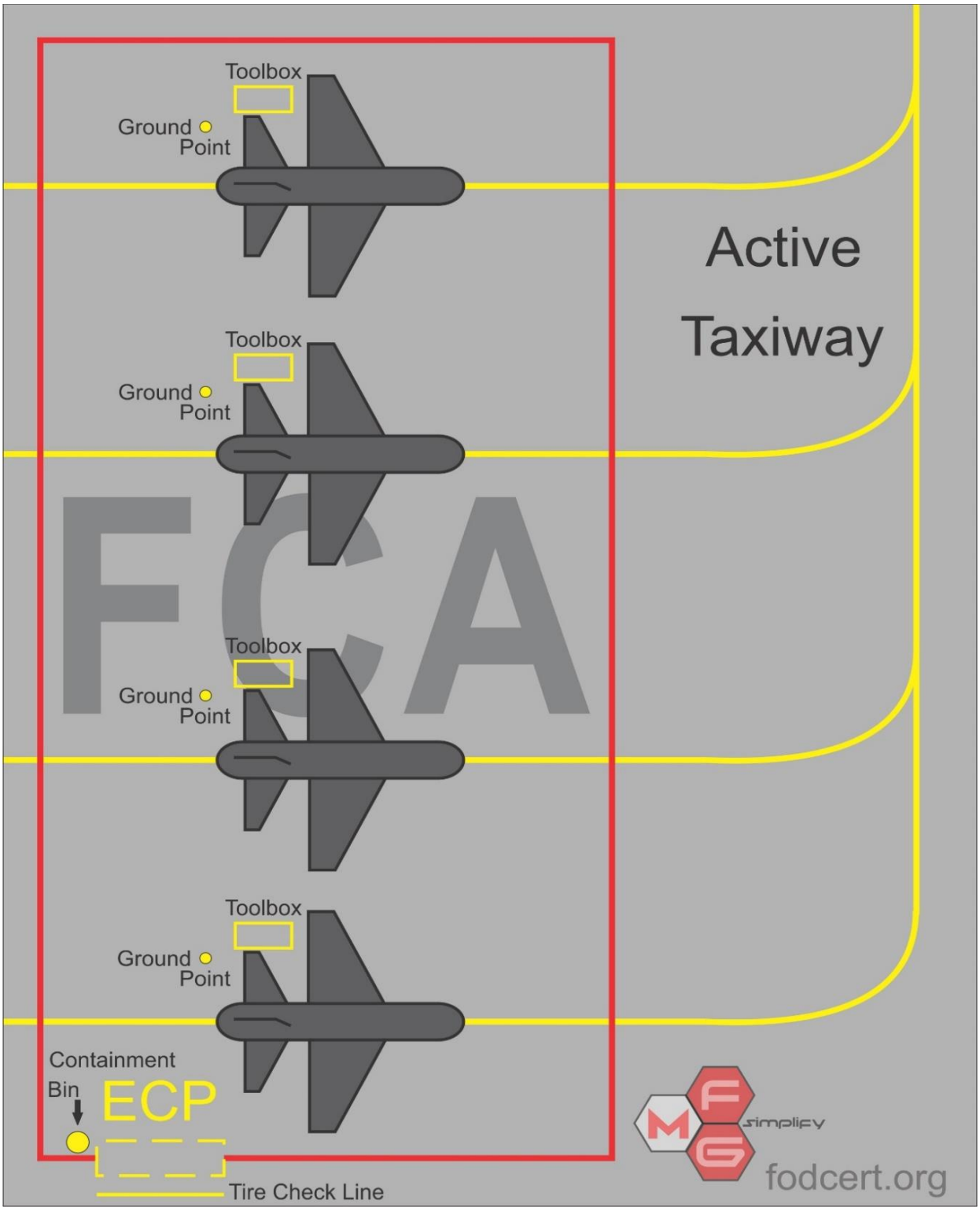

Figure 1: Open Ramp

(back to top)

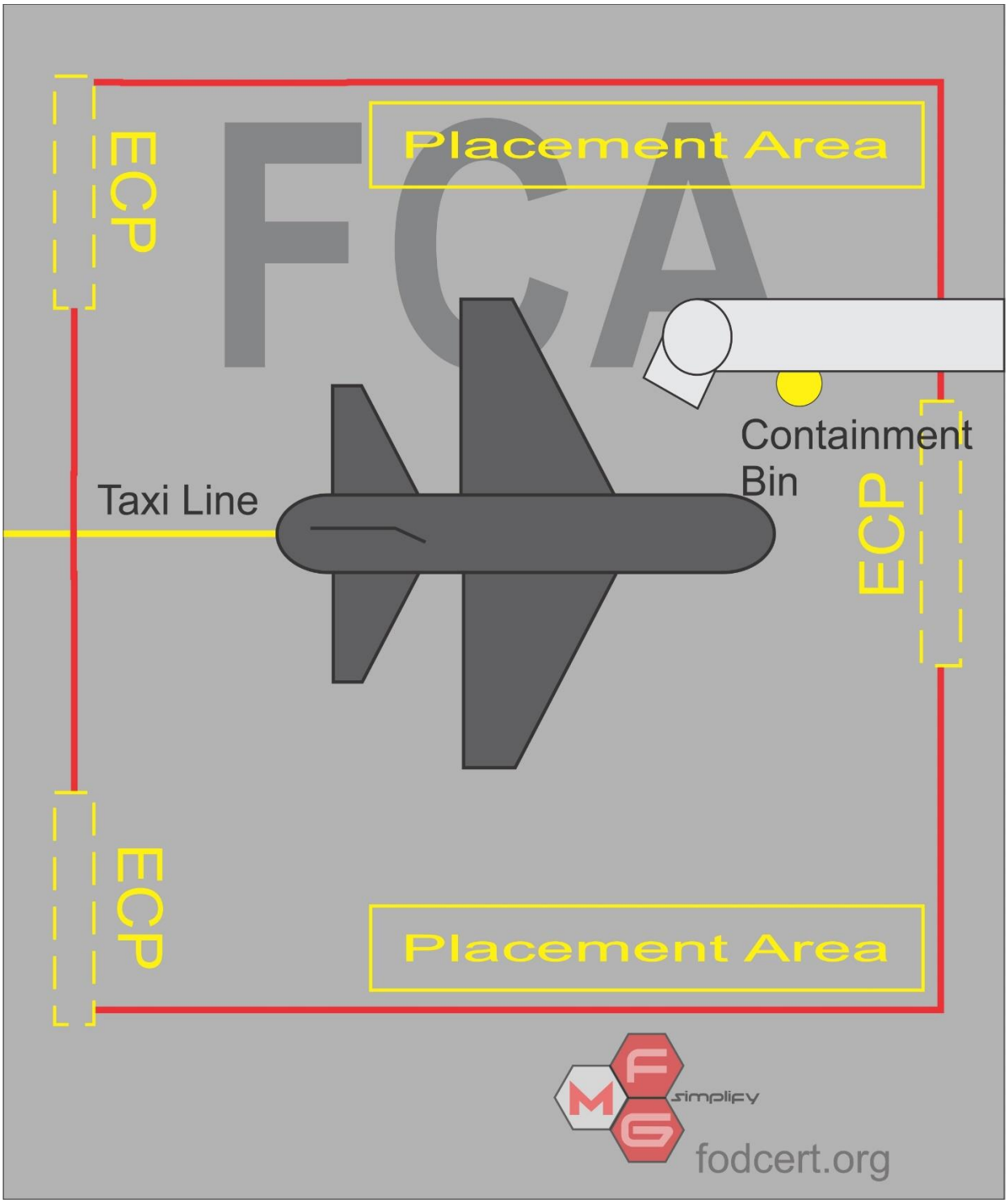

Figure 2: Terminal Parking

(back to top)

19.2 Manufacturing:

By its very nature manufacturing creates FOD. FOD sterilization in a manufacturing environment is difficult, but not impossible. Every manufacturing environment has its nuances but a few generalized steps can be made to fit any environment.

First, if employees stay in one place during the work day, there needs to be a FOD inspection sign-off sheet located at their stations. This not only reminds them of their FOD responsibilities, but also holds them accountable for performing daily FOD sweeps. A FOD sweep should be accomplished prior to a shift and it should be the last thing they perform at the end of a shift.

If employees move around throughout the day, FOD sweep sections need to be well defined and employees should be assigned to those areas to perform FOD sweeps daily. Sign-off sheets should be used as a reminder and for accountability.

Employees should not be assigned to one area for long stretches of time due to complacency. It is only human nature to stop seeing problem areas the longer you are assigned to an area. Switching around assignments gives fresh eyes to see issues that might be overlooked.

Manufacturing environments are a great place for using containment bins. Containment bins should be placed in a way that they are easily used, easily

seen, and easily cleaned. ECP's and specific locations known to create FOD are a great location for containment bins.

Lastly, any type of production planner, or step-by-step instruction needs to have FOD checks placed in strategic steps. Such as when a part is being closed, thereby preventing anyone from being able to see into the part, a FOD check should be performed and signed-off by both the operator and a Quality Assurance representative. A FOD check such as this needs to be signed-off by another individual that was not directly working on the part. The more eyes that are looking for FOD, the better.

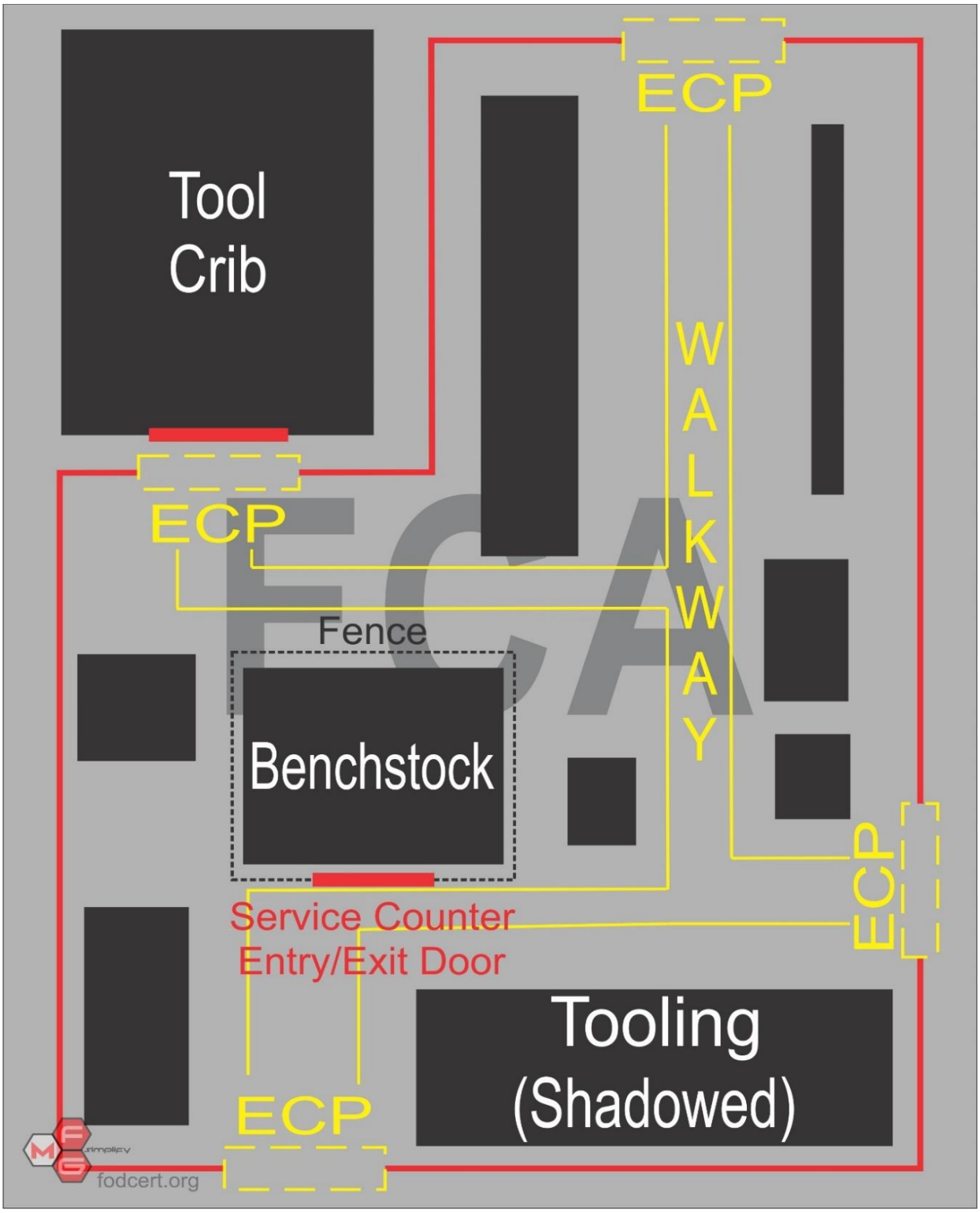

Figure 3: Manufacturing Floor

(back to top)

19.3 Maintenance, Repair, and Overhaul (MRO) and Hangar Maintenance:

In an MRO/Hangar environment, FOD control is vitally important. This is due to the unique environment an MRO/Hangar provides. Taking apart and then putting parts together requires a heightened sensitivity to FOD. Most aerospace parts are encased which means it is impossible for a FOD inspection to be accomplished after a part is put back together.

Any type of production planner, or step-by-step instruction needs to have FOD checks placed in strategic steps. An example would be when a part is being closed, thereby preventing anyone from being able to see into the part, a FOD check should be performed and signed-off by both the operator and a Quality Assurance representative. A FOD check such as this needs to be signed-off by another individual that was not directly working on the part. The more eyes that are looking for FOD, the better.

Openings, ports, lines, hoses, electrical connections, and ducts will be properly plugged or capped to prevent FOD from entering the system(s).

Part Storage Areas (PSA) need to be identified and, most importantly, utilized. When a part is not currently being worked on it needs to be placed in a storage area to prevent accidental FOD introduction. Also, having parts laying around is, in fact, FOD.

Before starting a job and after ending one a localized FOD sweep needs to be accomplished and signed-off. This can be a part of a planner or a sign-off sheet located in the area.

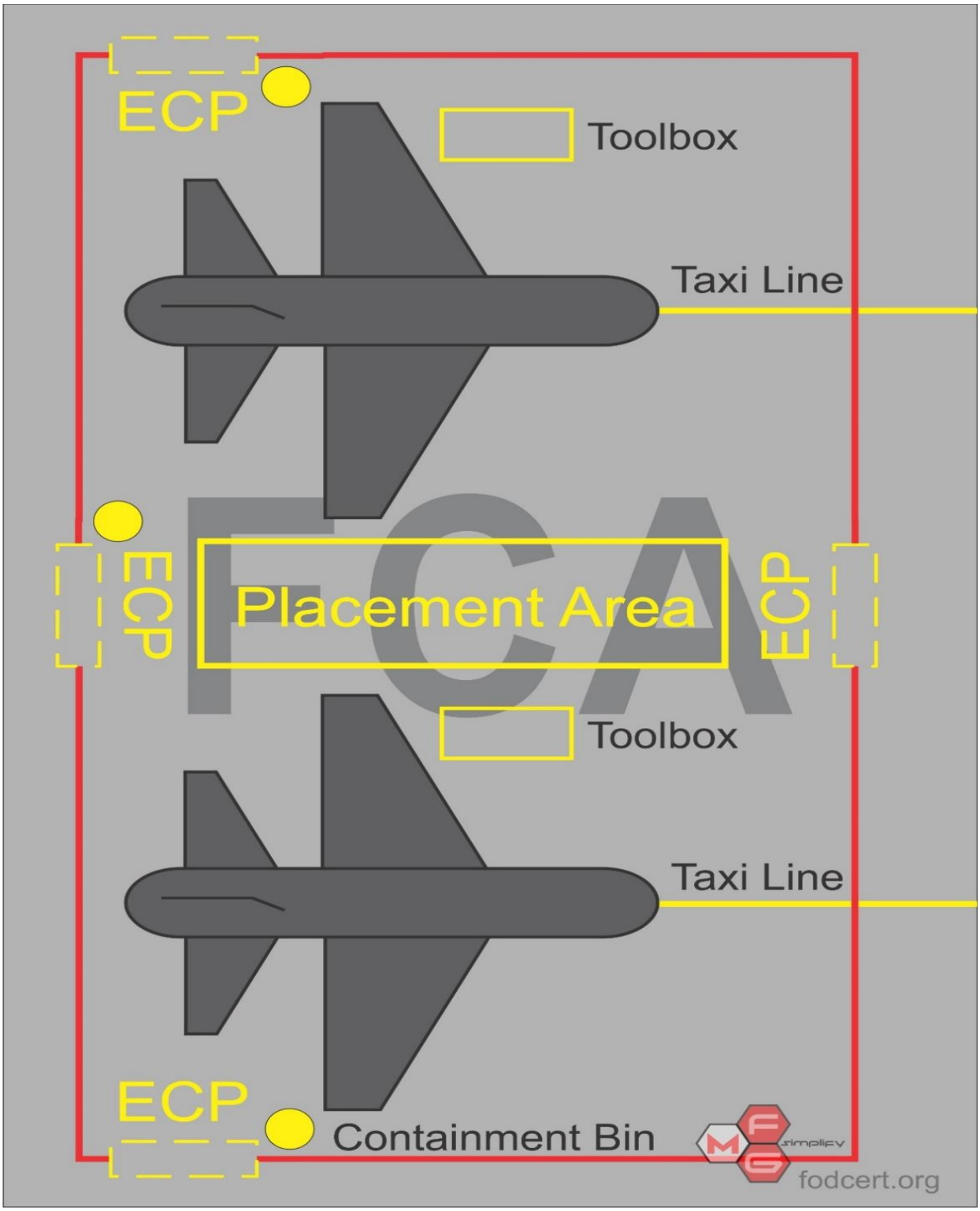

Figure 4: Hangar Floor

(back to top)

19.4 Space Operations:

Space operations take on a new meaning when it comes to FOD since these vehicles usually operate in zero gravity environments.

FOD migration within a zero gravity environment is a real problem and the only real solution is to have total tool and hardware control. Unlike aviation, something as small as the trimmed end of a cotter pin can become an issue during operations. These small parts can migrate from a relatively benign area to a critical area because of a lack of gravity. Therefore, total organizational hardware control not only means control of what was dispensed to an employee, but the return of trimmed or broken parts. Only dispensing exactly what is needed helps to ensure total organizational control over hardware.

Total organizational tool control means no personal tools should ever be allowed into an FCA. Lost tools are unacceptable in this environment. This FCA is too critical and sterilized for a lost tool not to be found.

Sterilization is taken to the extreme with space operations. Everything, including employees need to be documented before entering an FCA. An "Authorized to Enter" roster should be developed and maintained to ensure that only those who are required and qualified to enter an FCA are entering the FCA. ECP's should be guarded or locked to ensure unauthorized individuals do not enter. Pens, paper, rags, etc. all need to be documented when they enter the FCA and when they leave. This creates total organizational control over the FCA.

19.4.1 Authorized Areas

Authorized Areas are used when it is vital to ensure that only certain employees enter an area. From a FOD perspective, this allows for better transparency when a FOD incident occurs. When a FOD Manager can quickly narrow down those who were in an area when an incident occurs, it gives the ability of expediency. Quickly finding a root cause allows for reducing the possibility of identical FOD issues from occurring. Authorized Areas can also highlight training deficiencies either within the FOD Program or with employee training.

Numbering authorized areas facilitates the end user experience by creating an atmosphere where it is completely clear where an employee is authorized to be.

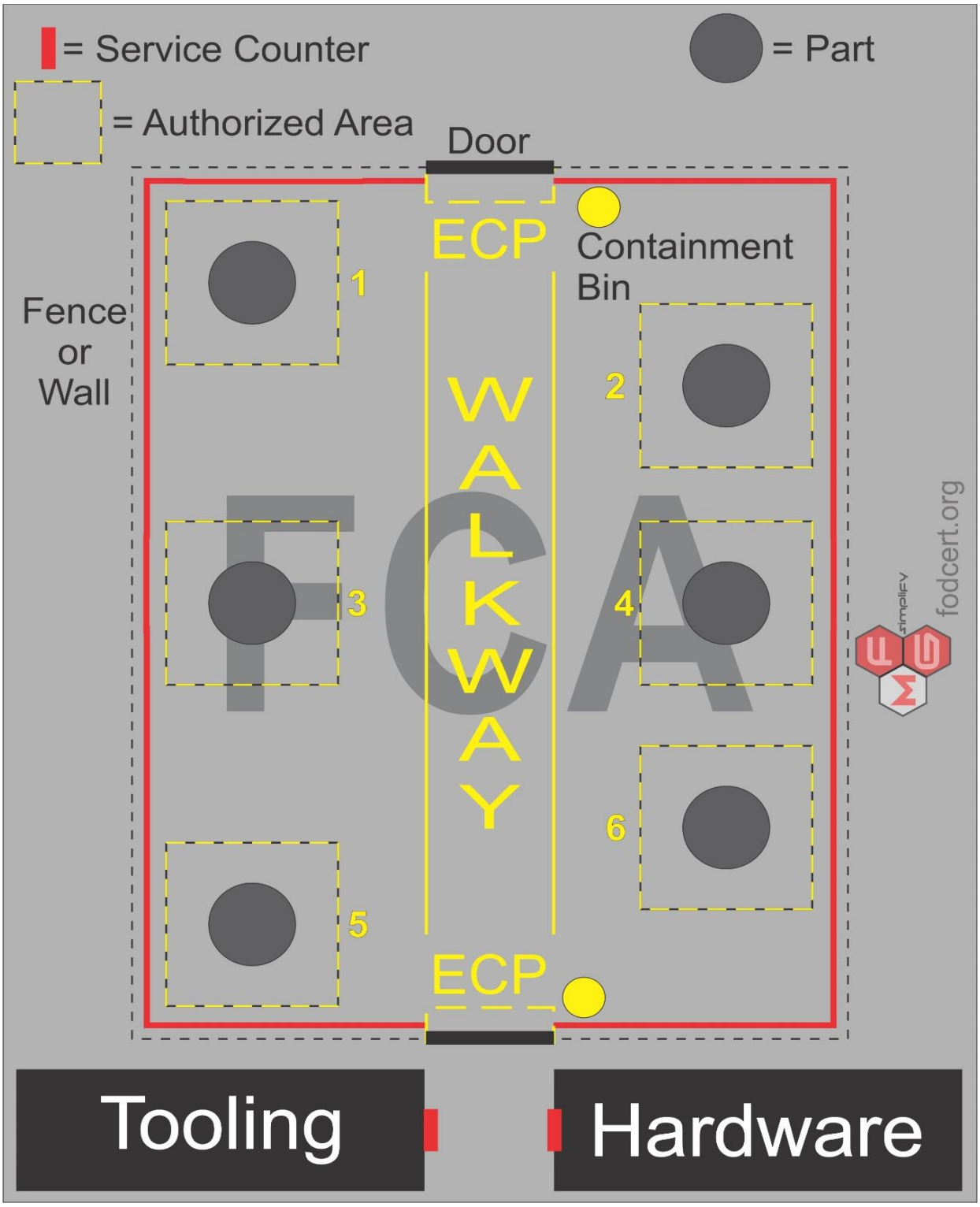

Figure 5 Space Operations Floor

(back to top)

19.5 Guests/Contractors:

Anyone who is a third party to a FOD controlled organization needs to have some type of FOD awareness training before entering a FCA. Training needs vary depending on the party involved. If a contractor will be in an FCA for days, weeks, months, or years their training needs to be comparable to an organizations employee. If the individual(s) are simply walking through an FCA, then a simple briefing will suffice. The FOD Manager will have the authority to determine what type of training is needed for third parties.

20.0 Housekeeping/5S

(back to top)

Housekeeping or 5S is vital to ensuring a FOD program is continuing to be effective. 5S stands for Sort, Set in Order, Shine, Standardize, and Sustain. Although 5S was not designed specifically with FOD in mind, it does provide a good template for a FOD program.

20.1 Sort:

Prevent accumulation of unnecessary items.

Evaluate items with regard to necessity.

Remove all parts or tools that are not in use.

Segregate unwanted material from the workplace.

Define Red-Tag areas to place unnecessary items that cannot be immediately disposed of. Dispose of these items daily or when full, whichever comes first (Containment Bins).

Create a culture of throwing away things that are no longer useful immediately.

Clear the working area floor except material currently being used.

20.2 Set in Order:

Arrange all necessary items so that they can be easily selected for use.

Put away items when they are no longer needed.

Arrange work stations in such a way that all tooling/equipment is near where it is being used.

Make it easy to find and pick up necessary items.

20.3 Shine:

Clean your workplace on daily basis completely or set cleaning frequency.

Use cleaning as a FOD inspection point.

Keep the workplace safe and easy to work.

Keep workplace clean.

Maintain safety.

20.4 Standardize:

Standardize the best practices in the work area.

Maintain high standards in a workplace.

Maintain orderliness.

Everything has a right place.

Place components according to their uses, with the frequently used components being nearest to the work place.

20.5 Sustain:

Not harmful to anyone.

Promote a "do without being told" atmosphere.

Perform regular audits.

Training and discipline.

Self-discipline.

Keep FOD program up-to-date with current organizational needs.

21.0 FPS 2020 Certification

(back to top)

21.1 Overview:

The FOD Program Standard 2020 (FPS 2020) is designed to promote trust between organizations within the aerospace industry. If the certification is to

be viable and trustworthy, FMG must ensure the highest quality audits are performed. This ensures that the highest quality organizations are being represented through the program. Certification, recertification, suspension and revocation are performed to ensure a “watering down effect” of the certificate is prevented.

21.2 Initial:

Certification is done through an audit by an FMG auditor at the location of the applicant. Because of the fluid nature of FOD control, it would be impossible for an audit to be done off-site. On-site audits maintain the integrity of the certification for current and future viability of the certificate.

An organization is given two (2) audit attempts to become certified. If a failure is determined after the second attempt. The organization is then unable to become certified for six (6) months. One last attempt to become certified will occur after the six (6) month wait. If the outcome is another failure, the organization is determined to be unfit and further future consideration will not be given.

These same rules apply to organizations recertifying.

21.3 Recertification:

Recertification is necessary to ensure that the FMCP standards are being continually met. This recertification also ensures the certification has continual merit and industry viability.

Recertification is done through an audit system where an FMG representative will go to the organizations site and perform an audit of all areas contained within FPS 2020.

Recertification is due every three (3) years from the date of initial certification.

If there is a lapse in certification, an initial certification will need to be accomplished. Because recertification's take precedence over initial certification's, a previously certified organization whose certification has lapsed could be without a certification for some time. Therefore, it is important for an organization to stay current on their FPS 2020 certification.

FMG will do their part in ensuring an organization does not miss their recertification by notifying them six (6) months in advance and then every month thereafter. Ultimately, it is the certified organizations responsibility to ensure that their certification is current.

21.4 Suspension/Revocation:

Because we take FOD and the FPS 2020 program seriously, when a current FPS 2020 organization fails an audit or something more egregious has occurred, a suspension or even revocation can be levied. Depending how serious the infraction is will be the deciding factor in the course of action taken by FMG.

Suspensions will be in 30 day increments, not to exceed 120 days. If by 120 days the issue(s) that brought forth the suspension have not been rectified, as proven to an FMG auditor, the suspension will become a revocation.

Revocation is permanent and the organization will no longer be eligible for reinstatement. Revocation is a last-resort option and will only be used in the most egregious of situations.

22.0 Individual Certifications

(back to top)

FMPC is an organizational based certification. FMG does offer individual certifications.

22.1 FOD Program Professional (FPP): FPP certification is meant to bolster a resume. It shows perspective employers that you have been trained in the basics of FOD awareness. This is a generalized certificate and should not be confused with an initial or annual training that should be administered through an organization's FOD Program.

22.2 FOD Advisor (FAP): because a FOD Advisor has more responsibility than an individual, but less than a FOD Manager, FMG has a FOD Advisor Certification. This certification is focused on the daily prevention, documentation and concepts contained within a FOD program.

22.3 FOD Manager (FMP): a FOD Manager has an important job. Our FOD Management Certification is an individual certification with a focus on the management of a FOD Program.

Conclusion

(back to top)

The FOD Management Group is an independent auditing body that provides a framework for effectively managing a FOD Program. FPS 2020 was designed to create a benchmark that can be used to create trust throughout the aerospace industry.

FPS 2020 is not designed to be an organizations FOD program. Certified organizations have proven that their FOD Program meets or exceeds the FPS 2020 Standard. FMG holds no responsibility for an organizations FOD Program's day-to-day operations.

FMG is responsible to ensure that those who are certified are in compliance when the audit occurred and for every subsequent audit thereafter.

FPS 2020 certification proves that an organization has a robust and effective FOD Program in place.

FMG is based upon international and independent standards: FAA AC No: 150/5210-24, AFI 21-101, NAS 412 with sector specific technical specifications for other-than flightline environments.

Read more about FMG at our website. www.fodcert.org.

FOD Program Standard 2020 (FPS 2020) Audit Checklist

Page Reference

All must be well defined, well maintained, well documented, current, and easily visible.

(back to top)