Do you have a "Shelf Life and Storage Program?"

In the last issue of ROTOR, I stated that for the next few issues I planned to devote at least part of this column to how to better manage risk as it relates to the way maintenance is performed on aircraft, in the work place (i.e. the industrial side of the equation), and that I would address how to improve compliance with both regulatory and industry standards.

The topic of this issue is "Shelf Life and Storage Programs." Why it is important that you have, and comply with, a viable shelf life limitation and storage program, what are the minimum areas and standards that it should cover, and what are some of the risks of not having a program?

Let's start with "why" we need a shelf life and storage program. The short answer is that a "Program" is needed to ensure the suitability for use of certain consumable products, parts, and/or components that may be used in the servicing, overhaul, repair, and/or alteration of an aircraft and/or any part or component thereof.

The list of items/products that are commonly used in aviation, that have a specified shelf life and/or specific storage requirements is longer than many people or companies are aware of. On the consumable side, most, if not all types of adhesives and sealants have a specified shelf life and specific storage requirements. Generally speaking, the more critical the application, such as the use of adhesives, resins, and structural films, for the repair or manufacture of bonded or composite structures, the shorter the shelf life and more stringent the specific storage requirements. Some of these materials' shelf life is as short as three months. Shelf life is normally expressed in months or years from date of manufacture, or in some cases, from date of shipment from the manufacturer.

Many other consumables, such as paints and paint-related products, penetrants, anti-seize products, potting materials, degreasers, engine wash compounds, corrosion inhibitors, electrical insulating compounds, dry film lubricants, loctite-type products, solutions used for various types of Non Destructive Testing (NDT), as well as many lubricating products, including some well known turbine oils, greases, and even some hydraulic fluids, have very specific shelf life and storage requirements. The classes or categories of products listed above should not, by any means, be considered to be all-inclusive. As you can see, the list of products you may need to track is extensive.

Storage requirements and conditions are equally important parts of the equation. In many cases, the integrity of a consumable product is directly linked to the conditions under which it is stored. Generally speaking, elevated temperatures and/or humidity have the greatest influence on reducing shelf life. A typical example is where the shelf life of a structural adhesive may be one year from date of manufacture if stored at 0 to 40 degrees Fahrenheit, three months when stored at 70 degrees Fahrenheit, and only two months if stored at 90 degrees Fahrenheit.

In many cases, components, sub-components, and even detailed parts have specified shelf life and/or specific storage requirements that may also include some degree of preservation. Examples of this are components that need some form of internal and possibly external preservation to reduce the possibility of corrosion. For instance, some gyros have a shelf life due to the possibility of the lubrication quality of the grease used in the high speed gyro bearings deteriorating.

You may want to consider storing all serviceable electrical and avionics components in sealed water/vapor proof packaging or in containers, with active desiccant. At the very least you need to ensure that all connectors, cannon plugs, pressure ports, etc., are properly capped and/or plugged to prevent corrosion and/or the entrance of foreign objects that might go undetected and lead to, at the very least, a blown component when powered up on installation.

The very least that a "Shelf Life and Storage Program" needs to accomplish is to "Ensure That No Item That Has Exceeded Its Shelf Life Limitation Be Used or Even Issued For Use On Any Aircraft, Component, Or Any Part Thereof."

Such a program needs to include policies and procedures for:

- Identifying and maintaining a database (a list) of all items that have "Shelf Life Limitations" and/or "Specific Storage Requirements."
- A receiving inspection process that can ensure that all incoming products are still within their shelf life limitation period.
- A process for physically identifying, labeling, and coding each item so that its shelf life can be readily determined and stating that the item is under shelf life control.
- A procedure(s) for reviewing (auditing) the status of all items under shelf life control, both in stock and previously issued items/products.
- Identifying and tracking repackaged consumables. This should include all appropriate information, such as part number, batch number, receiving information (for tracking), date opened, and expiration date. Note: Repackaged consumables with shelf life/storage condition requirements, on which the status cannot be verified should be disposed of per applicable company standards that it should cover, and what are the minimum areas and standards that it should cover, and what are some of the risks of not having a program?

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procedures and government regulations.

In summary, the use of any consumable product or item that has exceeded its "Shelf Life Limitation" and/or has not been stored in accordance with its "Specific Storage Requirements" for the production, repair, or alteration of an aircraft, or any part thereof, compromises the airworthiness and integrity of the aircraft and may have serious safety implications.

As examples, the use of out-dated structural adhesive, adhesive film, or pre-bond materials in a major repair of a bonded or composite structure will most assuredly compromise the integrity of the repair, and may lead to a structural failure. The use of out-dated lubricants, for example, may lead to premature wear and failure of bearings, gears, or splines that could result in the premature removal of a part or a component. This can increase the cost of operation or even result in an accident and I haven't even touched on the possible non-compliance and legal liability issues that can devastate a company.

A gain, in order to establish a viable "Shelf Life and Storage Program," you should:

(a) First determine what products in your inventory have a limited shelf life, static storage interval, or require a unique storage environment.

(b) Inventory applicable products and document the limitations, storage requirements, and quantities on hand.

(c) Monitor those products and limitations with a scheduled frequency that will ensure that no product will remain in stock or be issued for use beyond its shelf life or static storage interval and that the storage environment remains appropriate.

(d) Ensure that all control activity is documented and can be verified; i.e., what must be checked, who checked it, and when it was checked.

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