



IEAG INSIGHTS

AIRCRAFT PAINT: A PRACTICAL GUIDE

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At IEAG, we've been serving a vast roster of aviation industry clients for more than 60 years – and we are excited to share various key lessons with you that we learned along the way. Our Insights series offer best practices and gained know-how, practical guidance and advice, and help educate and inform in various areas of interest to our aviation community. Please don't hesitate to reach out with comments and feedback at insights@innotech-execaire.com so that we can serve you better.

AIRCRAFT PAINT: A PRACTICAL GUIDE

Aircraft paint systems are highly complex and a myriad of considerations can come into play when it's time to repaint an aircraft. For example, how long does a paint system last? How do you know it's time to repaint? And what is better – stripping the aircraft to its skin and painting or sanding and painting?

With hundreds of aircraft painted from its state-of-the-art paint facility located in Montreal, Insights talked to the experts at IEAG to bring you the latest benchmark considerations in the aircraft paint industry. **Kevin Thompson, IEAG's Director of Program Management**, has almost 15 years of experience managing various



elements of business aircraft programs, including those at IEAG's paint facility, while Martin Basque, a Paint Planning Specialist, has more than two decades under his belt as a paint expert, both at Bombardier and IEAG. They were both eager to share their knowledge of best practices for repainting business aircraft.

The longevity of paint systems and the benefits of proactive maintenance

Paint serves a purpose that goes far deeper than a shiny exterior. Thus it is important to understand the relevant industry best practices regarding rejuvenating an aircraft's paint system. Many say that a paint job lasts six to seven years

but Kevin Thompson suggests you can stretch it out even longer under the right circumstances, grooming practices, and maintenance processes. "In reality, for a business jet, it can last 10 years – as long as proactive maintenance is undertaken," he says. "Business jets don't have as many flying hours or cycles as commercial jets, so it really is possible."

So what's proactive maintenance? In other words, what will make your paint job last? In

an ideal world, when an aircraft isn't flying, it should be kept in a hangar and out of the sun and washed after every flight. Realistically though, that's not likely or even possible. "The different materials used in building an aircraft flex and stress at different rates," explains Martin. If improperly maintained, there is increased risk of paint erosion, cracking and/or peeling which may, if left long enough potentially compromise the structural integrity of an aircraft's aluminum skin. "It's normal for sealant joints to crack and for paint to chip in into-wind areas or where there are panels that have a step up. These take real abuse from the elements."

Other factors to consider are extreme temperatures, flight hours, corrosive environments, sun damage and where the aircraft is based. If it's near an ocean, the exposure to salt will cause

wear and tear on the paint system. Any of these circumstances will compromise its lifespan.

With all this in mind, there are some basic actions that will help keep your paint system in its best possible state. For example:

- Wash the aircraft regularly, especially after de-icing fluids have been used or if Skydrol comes into contact with the aircraft;
- Undertake preventative touch-ups on sealant;
- Immediately touch up any small chips or cracks, skin joints and into-wind erosion;
- Never apply paint blends to aircraft outside of the paint shop to avoid dust grains; and
- Only use products that have been approved by the aircraft manufacturer. It's wise to avoid waxes that contain silicone because this material can prevent paint from adhering during touch-ups.





The optimal moment in an aircraft's life to consider repainting your aircraft

The other thing to keep in mind is that when an aircraft reaches 7 to 10 years of flying, most operators are faced with major maintenance needs, requiring the removal of panels. “So it’s a good time to redo the paint system since the aircraft is grounded for maintenance anyways,” Kevin adds. Fleet operators might be on a faster schedule for repainting as aircraft are not often stored in hangars and the increased hours in operation puts more stress on the paint system. But for a business jet, the 10-year mark is certainly within striking distance, Kevin suggests. As mentioned earlier, other contributing factors can include the environment where the aircraft is located and the geographic areas in which it is intended to operate.

Understanding the differences between strip-and-paint and sand-and-paint

Of course, the next important question is whether your paint system rejuvenation should be a strip-and-paint or a sand-and-paint. Kevin and Martin went through the

differences between these two processes and the advantages and disadvantages of each. Understanding the fundamentals of each option will help operators make educated decisions.

STRIP-AND-PAINT

Strip-and-paint involves removing all the paint through a chemical process that is highly toxic and requires the disposal of environmental waste and VOC emissions. According to Martin, it is a more costly process from a materials, manpower and downtime perspective but “it is pretty much the norm when you need to undertake major scheduled maintenance.” It also has distinct benefits: “You can do a proper inspection of the aluminum,” he says “Removing all the paint allows for an detailed inspection of the aluminum skin. You can then understand exactly what’s going on with your aircraft and then deal with any resultant maintenance needs. In fact,” he points out, “this is one of the more popular benefits of the full strip approach in that the paint system will be rebuilt from the skin up.”

SAND-AND-PAINT

Sand-and-paint by contrast, involves mechanically sanding the down the paint but leaving the epoxy primer on the skin. “In most cases it can be less costly and result in a better finished aesthetic product because we are using



the old paint system and building it up with new filler primer and a topcoat. There are natural derivations in the manufacturer's assembly of the fuselage that a sand-and-paint can help smooth over," Kevin explains.

Another element to consider when contemplating a sand and paint versus a strip and paint approach is the aircraft itself. For some smaller makes and models, over 50% of the aircraft's fuselage can be made up of composite panels – which precludes the use of a chemical stripping process on these composite surfaces. "In case such as this, it might not be worth doing a strip-and-paint," he says.

In other cases, a sand-and-paint approach can be the best option for changing the look of an

aircraft. "If you just want to change the stripes, for example, there's no real advantage to proceed with a full strip-and-paint when a sanding approach will do just fine," Kevin adds.

Of course, no process is perfect. One disadvantage to sand-and-paint is that in cases where the aircraft paint may have been ill-preserved there could be a potential for a failure in paint adhesion. Says Martin, "It can happen that the new paint won't adhere but preventive maintenance is the key to preserving the original system". Moreover, he points out that a good paint facility will do an adhesion test on the aircraft to make sure that the sand-and-paint is the best option before proceeding and potentially ending up with a nasty surprise post-paint.

Planning

Be sure to allow ample time to coordinate with your paint facility on everything from the approved rendering and paint specification drawings to colour selections and stripe layouts.

For a full strip & paint, a typical base white with 2 stripes event can take up to 25 days, with more

complex colours and paint schemes sometimes taking in excess of 30 days. A sand-and-paint can take less time but still run you about 15 days in actual downtime in the paint shop.

Important to note however, that paint facilities typically need longer lead times in order to secure



line up all the necessary and proper paint and materials for your masterpiece, so be prepared to book your induction slot anywhere from eight to 12 weeks in advance in order to ensure as smooth and seamless input and output.

Some notes about paint facilities and paint

When clients are considering a paint facility, they should ask questions about the filtration system in the paint shop. There are two types: a down-draft system and a cross-draft system. In a down-draft system, the air comes from the top of the aircraft and exhausts out on the floor on the left and right sides of the paint bay – and can result in dust landing on the aircraft during the process. “In a cross-draft system, on the other hand, the air comes from nose to tail, crosses the entire bay at the front

wall and exhausts at the back wall. The flow of the air means that there’s no overspray landing on the aircraft and significantly less dust getting into the paint,” explains Kevin.

Kevin points out that an electrostatic application system vs. a conventional one also reduces overspray, improves adherence of paint layers to the aircraft and reduces the overall environmental footprint.

It’s important to know that the aerospace coatings industry is lagging behind the automotive industry, which has already transitioned from chemical reaction curing paints to water-based paint (base coat, clear coat). “The water-based paint would be faster curing, less toxic and with significantly reduced VOCs,” says Kevin. “It’s less harsh for employees and the environmental impact is less severe. Our industry is working towards this, but we’re not there yet,” he adds.



In the end, as with any major planned maintenance event for your business jet, it is important to do the homework and ask the questions. The reward will be a beautiful aircraft exterior paint finish that will portray your chosen colours proudly both in-flight and on the ground for many years to come!