DYNABRADE®

CASE STUDY

INNOVATIVE SYSTEM SOLUTION FOR AIRPLANE REFINISHING

WE LISTEN. WE OBSERVE. WE INNOVATE.

MADE IN USA

Airplane refinishing is a lengthy, in-depth process, often taking multiple days to complete. Regulations and demands from manufacturers and airlines can bring costly challenges to a facility. Although the paint removal process is a critical requirement prior to repainting, the sanding method is most often reduced to an afterthought. Potential options for improvement aren't typically considered until increased requirements are prescribed. However, with the right system, Dynabrade can positively impact both labor and abrasive costs, improving efficiencies as well as the bottom line.

METHODOLOGY AND CHALLENGES

Every aircraft, whether passenger or freight, is an expensive asset and downtime is expensive. Most aircraft are repainted about every seven years. Composite parts in particular require special care, as substrate damage is very costly. Composites are being used more and more on current popular models made by Airbus and Boeing. Prior to painting, every surface must be prepared so that the new paint will adhere properly.

Currently, while some surface preparation is completed with chemical paint stripping, the composite surfaces, and some of the aluminum ones, are abraded manually with random orbital sanders and coated abrasive discs. The goal is to remove all the old paint before new paint is applied. Material removal and capture rate are driven by several factors, including abrasive type, tool speed, contact, and vacuum being employed. Vacuum systems are integrated into the process, facilitating dust collection at the source to minimize operator exposure as well as to capture and weigh all the removed dust. Paint imposes a significant weight to the aircraft. On commercial airliners, that weight translates to a reduction in cargo, passenger and fuel carrying capacity, and that means less money to be made on every flight Collecting all of the paint removed ensures the same amount that will be reapplied, thus ensuring overall flight-worthiness.

There are major challenges when performing material removal from an aircraft. One of them is that typical industrial-duty pneumatic sanding system is heavy, particularly with long runs of attached pneumatic and vacuum hoses. This can expose the operator to harmful vibration and resistance, as well as the potential of damaging the substrate if the tool is dropped. Usually, the operator will hold the tool in front of them, above them, or in some other contorted position to perform their job, which is a health risk that can lead to injuries of shoulder, arm, wrist, and hand. This ergonomic stress can lead to operator fatigue, which impacts process time, finish consistency, and overall productivity.

Another key part of the process is to ensure that the sander remains flat on the surface. A tilted sander leads to inconsistent material removal rate and a higher chance of gouging the part. Whenever part of the sander lifts off the surface, the vacuum seal fails, spewing dust everywhere. Many aircraft paints and primers contain lead, cadmium, or hexavalent chromium, exposure to which is dangerous to people and the environment and regulated by OSHA. While operators typically wear protective gear including respirators, the facility still is required to collect and clean all of the dust. Otherwise, they will incur with significant fines. Dust collection is critical for overall operator safety and the overhaul process.

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> *~Joel Rich, Production Manager at IAC Spokane*

PROCESS PROBLEMS

International Aerospace Coatings (IAC), a global leader in aircraft painting and graphics, works with international airlines across the globe, providing painting services and solutions that ensure regulatory compliance. They currently operate 36 paint lines across 13 locations in Europe and the United States, painting up to 1,000 aircraft per year globally.

Their two hanger, three bay painting facility in Spokane, Washington handles narrow body commercial aircraft, primarily. Joel Rich, Production Manager at IAC Spokane, explains, "The bulk of what we do are the Boeing 700 through 900 series, including the 737 Max Airliner. Boeing as well as Southwest, Alaska and Viking Airlines are the majority of our business." They currently are under contract by Southwest to remove their old paint scheme and apply the new heart scheme for the next seven years.

"We can handle four aircraft at a time in our two hangars, rotating every five to six days," says Rich. "When a plane comes in, out of [the first] 3 days, 60 hours will be in sanding, 10-12 hours per shift. [Our operators are] grinding away on the wings, [rudder & engine nacelle] from start to finish. Durability is key."

The process they utilized prior to Dynabrade's assistance included sanding with random orbital sanders along with a self-generated vacuum bag system. The result was not satisfactory, with much of the dust air bound, creating concern for operator safety and cross contamination. Rich adds, "Any percentage of dust that is left out there, can increase the percentage chance of there being contamination in the final finish so the more that we can capture, the better."

To rectify the problem, IAC began to utilize a system of pneumatic industrial vacuums attached to their sanders. With this solution came another problem; lowered productivity due to air consumption. "We can't have as many workers on the aircraft at one time; it uses an awful lot of our air," says Rich.

Lastly, another issue needing improvement was the percentage of dust collection they were getting from their process. Required by Southwest to submit all the collected dust from the rudder portion, they found their system to be very inefficient, requiring skilled calculations to ensure the amount of paint removed is equal to the paint reapplied. "The more exact you can get the calculation with the rudder weight, meaning the material we are taking off, then weigh what we put back on, is critical for air worthiness," says Rich.

The Dynabrade team saw a clear opportunity to optimize efficiencies, and ultimately save IAC time and money.

RESULTS THAT IMPROVE THE BOTTOM LINE

PHASE 1

IAC began testing the new Dynabrade Dynorbital Extreme Random Orbital Sander (Models X61H & X61VHS). The results were impressive. American-made from the highest grade materials for long-life and high durability, the Extreme proved to be up to the challenge. Rich states, "When we switched from other sanders to your sanders, there was a marked improvement. The durability is very high. Out of the 20 sanders we've had for months, only 1 has broken, and that's because we dropped it." The Dynorbital® Extreme showed that it has the greatest power and most consistent speed of any palm-style orbital sander on the market. Power and speed combine to quickly and reliably remove aircraft paint from any location, while it's lightweight design and ergonomic features kept IAC operators safe and comfortable throughout their day. "We exclusively use Dynabrade sanders right now," acclaims Rich. The result has been increased productivity through the Dynorbital Extreme's innovative and durable design.

PHASE 2

IAC began testing the Dynabrade Raptor Vac Division 2 Vacuum system (Model 61440), specifically on the most challenging tail rudder section. Working with our team, a custom system was created, including extra-long length hoses made with non-scratch mesh protection (Model 31972) for improved reach and increased protection against damage, as well as a non-tear HEPA bag (Model 61125) to ensure maximum dust capture & retention rates. The feedback was once again very positive.

After working with the Dynabrade team, the air operating the Venturi vacuum system was found to be optimal at 50 PSI, resulting in noticeable improvement to their overall productivity. With the same air usage, the Dynabrade system allowed IAC to increase the overall vacuums being ran from three units to six units. Their old vacuums did allow for three sanders to be used on each system, while Dynabrade's system allowed for two to be ran from each. However, due to the increased ability to run more vacuums with less air consumption, the facility is now able to run a total of twelve sanders, increasing their productivity a total of 25%. In doing so, the sanding application which once took 60 hours to complete, now can take as little as 36 hours with the Dynabrade Sanding System. This means IAC has the potential to reduce the time it takes to return aircraft into service by as much as 1 day per plane, allowing them to complete more projects annually. Their increased capacity equates to millions of dollars in increased revenues annually.

WE LISTEN. WE OBSERVE. WE OPTIMIZE.

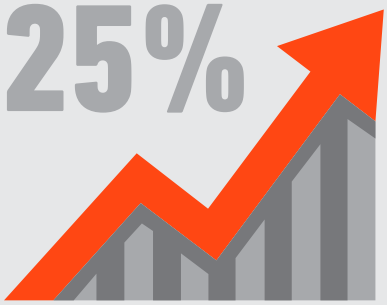
Dynabrade offers high-quality tools and innovative solutions to improve the operator's environmental safety, process time, and finishes which reduces our customers' costs. Substantial cost savings can be achieved by using high-quality, American made Dynabrade products and by focusing on reducing cycle times for labor intensive operations.

Unlike other non-domestic manufacturers, Dynabrade employs a direct sales force that offers hands-on cost savings assessments, bringing value to our customers like no other. We quantify the value Dynabrade can add to your customers' bottom line when compared to an existing process. Value can be realized in dollars and cents, time saved, and several other quantifiable factors that our sales team has been trained to identify.

By providing documented cost savings, Dynabrade is a proven partner that offers the expertise needed to help their customers solve their process challenges. By working together to understand the process, and then think strategically on how to improve it, Dynabrade can certainly save time and money — all to improve a bottom line. That is the Dynabrade difference we deliver every day.

Increased Productivity

25%



Decreased Overall Preparation Time

by as much as
1 day
per plane

Millions of Dollars

in Potential Increased Revenue

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ABOUT DYNABRADE

Dynabrade has earned a reputation for excellence and a position of leadership in the innovative design and manufacturing of unique portable pneumatic abrasive power tools, related accessories, and dust collection. With our total systems solutions offerings, we are able to meet the specific needs of many industries. Our products are used in a variety of applications on nearly any material that requires surface preparation and finishing. We are easy-to-do business with and supply these products quickly to customers through a worldwide network of professional distributors. For more information on Dynabrade products & process solutions, please contact your local distributor or territory manager today. Or for more information, go to Dynabrade.com

PERFORMANCE ASSURANCE CASE

For Optimal Dynabrade Tool Performance

The "All-in-One" case to improve your efficiency. Audit and increase your performance with this complete kit by Dynabrade.

AEROSPACE CASE STUDY **D19-16**