

Aerospace News from Wheelabrator

Issue 3 – October 2009



Prepare to take off!
Welcome to this new edition of
Aerospace News from Wheelabrator,
a newsletter dedicated to the
provision of surface preparation
solutions to the aerospace industry.

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Continual improvement initiatives

Wheelabrator demonstrates 100% customer dedication

Wheelabrator is delighted to add another important certification to its portfolio by recently gaining the prestigious AS / EN 9100 Aerospace Quality Management System accreditation to perform sub-contract finishing of customer parts at its Birmingham site.

Not only has it achieved this high-status endorsement but qualified with an impressive 100% score, meaning no non-conformances were identified and top marks were attained.

AS 9100 is a widely adopted and standardised quality management system for the aerospace industry. This approval recognises the people, procedures and processes the Birmingham site has implemented to deliver products that meet and exceed the expectations of clients in the aerospace industry.

Lloyd's Register Quality Assurance (LRQA), the certification body that carried out the assessment, identified Wheelabrator's strong points as follows: "The system is mature and effective. Evidence was seen regarding the introduction of, and commitment to, continual improvement initiatives. The technical process for vibratory finishing comes across as well planned and robust, in particular with regard to the use of detailed product trials and obtaining customer acceptance before proceeding with the processing of product. There is a very good focus on meeting customer requirements and no improvement opportunities are recorded at present."

"Our customers can be confident with Wheelabrator's total commitment to quality products and service; AS 9100 is one of the key milestones of our strategic plan to develop a successful aerospace customer portfolio. Of course, all of our customers in all sectors will benefit from improvements to our Quality and Systems processes."

Paul Upton, Wheelabrator



Wheelabrator established a dedicated three-strong assessment committee at the Birmingham site, and the 12 month bid to secure the accreditation culminated in a two day in-depth audit at the site to ensure the implementation of common practices.

Paul Upton, Quality & Systems Manager, Wheelabrator, headed the group's campaign and regularly attended task group meetings with experts involved in maintaining the scheme.

Colin Worthington, General Manager, Wheelabrator Plus, another member of the assessment committee, added: "We're delighted to have secured this prestigious accreditation which will promote and strengthen our relationships with original equipment manufacturers (OEMs) and fellow AS / EN 9100 accredited suppliers. While we already conform to the ISO 9001 standard, this new endorsement of our equipment and processes is an added reassurance of the exceptional service we provide."

MT Aerospace prepares to fly high with Wheelabrator

Efficient scale removal from tanks for the aerospace industry



High pressure and extreme temperatures are definitely something that materials sent into space need to cope with. The fuel tanks for the European carrier rocket "Ariane" are an important component of the aerospace project and have high complexity and extraordinary safety requirements.

This component is produced by MT Aerospace. A Wheelabrator airblast machine operates to remove scale from the dome and cylinder segments. These parts have a diameter of 3000mm, a max. height of 3500mm and a max. segment weight of 6.3 tonnes. The machine is equipped with a transport car and a hydraulic roof oscillation, aluminium oxide is used as abrasive. The layer of scale on the cylinders and dome which remains on the surface after enhancement is removed by the airblast machine.

The process must ensure a minimum roughness of the exterior and interior surfaces so that subsequent coating can take place. The blasting of the dome and cylinder segments is achieved in a 2-shift operation by a fully automated, pressure-fed blast machine, which up to now has been equipped with a Sinumerik control.

After many years of operation, the abrasive was causing a high level of wear and tear, which meant a complete overhaul of the airblast machine was necessary. The Wheelabrator Plus team would do this as part of the Equipment Modernisation Programme (EMP).

The aim was to increase the driving speed, hence an adaptation of the electrical control to Sinumerik 40D, which instigated a completely new electrical installation for the blast machine.

Apart from a greater efficiency and process reliability, the main focus of the Wheelabrator Plus modernisation programme was to enhance the parts handling system. The tank segments are now blasted in the revamped machine from both sides in one single process cycle and remain in the blast chamber of the machine for the entire period.

The EMP process by Wheelabrator involves a diligent preliminary inspection and analysis and the improvement of singular process flows.

The combination of the modernisation elements installed at MT Aerospace now provides a 50% increase in the total blasting capacity compared to the former blast machine.

Further improvements have resulted in a reduction in machine wear, a proven increase of machine availability, simultaneous reliability of the production process and a continuous high quality blast result.



Peen forming

Peen forming at Dassault Aviation, Seclin, France

Peen forming by blasting with steel shot is now carried out by Dassault Aviation at their Seclin site (northern France) to correct the distortion of mechanical parts after their shapes have become altered during the manufacturing process, or to complete the shape of the Falcon 7x wing panels after hot forming.

The new 108m² Wheelabrator blastroom is equipped with two generators with continuous flow allowing the projection of steel shot with a diameter of 0.8 to 2.0mm.

This new equipment has improved ergonomics and has speeded up the process of the forming tests on Falcon 7x wing panels.

The Wheelabrator blastrooms are equipped with two closed circuit machines and represent the preferred solution for various applications. The air and dust filtration system, available for all equipment in the range, is completely integrated and therefore needs no additional ducting. The blastrooms are compact, self-contained and provide easy access for maintenance operations.

The encouraging test results so far mean that Dassault Aviation will also trial peen-forming for a different application - to create the curve of the Falcon wing panels - this will replace the tooling currently used (press, boards, mallet) and will generate a substantial cost reduction.

Further training for the operators of the process has been included in the annual training plan, and the extension of the system by two further blastrooms is planned.



Tailored solution

Tailor-made solution for AIA de Bordeaux, France

Under the Ministry of Defence, specifically the Air Force, Atelier Industriel de l'Aéronautique (AIA) based in Bordeaux, France is responsible for the industrial maintenance and overhaul of the Aeronefs engines.

AIA had to renew their shot blasting machines as most of their equipment was becoming obsolete and dated back to the 1960's. Moreover, given the space constraints in the factory at the time, the machines were located in a higher level with a staircase to access them. This meant that all the maintenance operations on the machines had to be done from underneath. Also, the shot blast machines were not conformed to the latest standards for safety and the environment in use in the aerospace industry.

Further to a tender organised by SIAe (the parent company), Wheelabrator's experts offered a tailor-made solution for this application: the Ventus 170 blast cabinet.

The Ventus 170 is a suction type hand blasting cabinet specially designed for applications with very strict quality and productivity requirements. The cabinet offers state-of-the-art functions allowing the reduction of media usage in the operating mix, mainly due to the use of a power pack, equipped with a cyclone combining the recycling of the media and the de-dusting. This type of equipment is mainly used for applications such as depainting, superfinishing, surface preparation prior to

painting, corrosion removal and cleaning in general. The Ventus 170 has a cabinet size of 1700 x 1700 x 2000mm and can accommodate parts up to 1500 x 1000 x 1200mm in size.

In 2009, to answer the customer's technical specification Wheelabrator proposed two machines. The first machine is a manual type machine dedicated to de-painting, using plastic media, which allows a very soft treatment of the part. It replaces a blastroom using vegetal media bought in the 1960's. With the old equipment, the operator had to wear overall protective clothing and blast the part inside the blasting chamber. With the new Ventus 170, all the operations are carried out from outside the blast cabinet, which gives more comfort to the operator and is more environmentally responsible.

The Ventus 170 cabinet also answered AIA's concerns regarding space constraints, it did not require any civil works to be done as the machine is pitless and does not need an upper level for maintenance.

The second machine is similar to the first machine but has an automatic horizontal movement of the nozzle. It is dedicated to the cleaning of the parts prior to painting and uses aluminum oxide.

With the second machine, the cycle time is reduced as the cleaning of the parts can be achieved automatically while the operator is

using the first machine for the manual de-painting.

Wheelabrator won the tender as its solution proved to be the most cost effective and technically advanced offer.

Moreover, AIA de Bordeaux was already using Wheelabrator technology with full satisfaction. In 2005 AIA had consulted Wheelabrator to find the best solution for the de-painting of composite parts, which resulted in an order being placed for an automatic plastic media blasting machine.



Continuing to provide peening solutions

Wheelabrator® Inline Peening Machine

Wheelabrator continues to provide innovative peening solutions to Skills Inc., in its Auburn, Washington facility. With a September 2008 installation of a Wheelabrator Inline Peening machine; this is the company's second Wheelabrator installation in 3 years. Skills Inc., a supplier to major aircraft manufacturers, approached Wheelabrator for a solution to simultaneouslypeen both sides of in-spar rib components. Wheelabrator assured Skills Inc. that technical expertise offered by its rich experience with such applications would guarantee success where other contenders could not find a technically feasible solution.

"Given our previous experience with similar projects, there was no doubt in my mind that this was achievable," states Ron Wright, Wheelabrator Sales Representative who worked with Skills Inc., to achieve their peening goal.

The Inline Peening machines supplied to Skills Inc. contain non-marking conveyor rolls that transport the part through a blast stream consisting of an identical arrangement of reciprocating nozzles (4 up blast, 4 down blast). The strategic positioning of these 8 nozzles is critical to the overall peening process. Single and multiple axis nozzle manipulation directs the media stream at specific part locations. The Wheelabrator® Inline Peening system is ideally suited for processing conventional aerospace components such as wing spars, structural members, composite components as well as non-aerospace components.

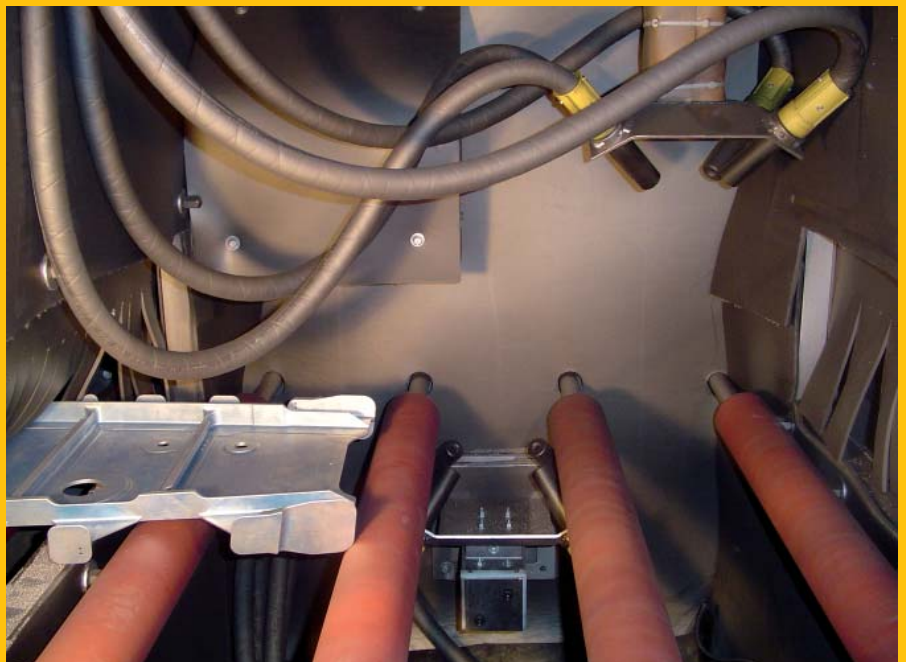
"Our acquisition of a second peening machine from Wheelabrator has allowed us to expand our capacity and provide redundant processing capability. The second machine was designed and built to our custom specifications. The build process was completed without a hitch and the machine was installed and certified in record time," stated Mr. Todd Dunnington, CEO, Skills Inc.

The in-spar rib parts are loaded on an in-feed roll conveyor that carries the parts through the blast cabinet. As each part is loaded, a barcode reader identifies that part's peening specifications, and uploads this process information electronically to the main control system. This is a key advantage of this user-friendly, automated system that allows the operator to program and store process techniques. Using a touch screen interface, the operator can control media size classification, flow rate, and air pressure to ensure consistent peening results. Detailed diagnostic logic also provides critical feedback when troubleshooting.

The Skills Inc. Auburn facility also has many capabilities that are approved and audited by NADCAP (a supplier management and audit system for suppliers to the aerospace industry). Both Wheelabrator peening systems were designed and built to be compliant with the stringent requirements of NADCAP and other OEM audit systems. This includes automatic monitoring, controlling

and reporting of critical process control parameters such as air pressure, media flow, media size and real-time display of the process, all of which contribute to repeatable and consistent peening results. With this machine and its NADCAP accreditation, Skills Inc added shot peening to their competitive scope of services. "Peening has become a key part of our sales strategy and combines nicely with our NADCAP approved chemical processing capabilities", confirms Mr. Dunnington.

With the first machine installation in 2005, a Wheelabrator technician spent significant time training Skills Inc. Quality Assurance and Engineering personnel on its Wheelabrator system. The thorough training made the installation a seamless integration with no requirement for additional training. Both machines were pre-assembled and a run-off test occurred in the Burlington facility prior to shipment. This testing drastically reduced installation and start-up time at site.



Shot peening applications

MPR Series Machines

The Wheelabrator Technology Centre in Charleville-Mézières, France, designs, develops and manufactures a wide range of a multi-axis shot peening equipment. In addition to their renowned MP range (CNC machines), the MPR (robotised shot peening machines) range offers optimal solutions for various shot peening applications in the aerospace industry. From the smallest MPR 1500 to the MPR 3500 LDG, all machines are equipped with a robot (or 2 robots in some cases) dedicated to the nozzle movements, the positioning of the parts and other additional axis.

The range of machines is extremely versatile with a user friendly interface, allowing easy programming, development capability from 3D parts and flexible, easy operation.

Corresponding to the strictest aerospace standards, the machines are equipped with process control systems, auto calibration

systems and a whole range of computerised systems allowing the traceability of the shot peening treatment, self-diagnosis and repair.

- **MPR 1500:**
For part dimensions with a maximum diameter of 1500mm. This compact machine, in its basic version, is equipped with a 6-axis robot and a NC turntable. Various options are available to suit the strictest technical requirements such as a turntable with satellites, an additional axis movement and/or second robot.
- **MPR 1800:**
This machine is equipped with 3 synchronized axis, mainly used for the precision peening of engine components, such as disks and compressor shafts.
- **MPR 2TR700:**
The machine is equipped with NC tables located on the revolving door. This allows

for a simultaneous loading and unloading of the parts.

This machine is especially suitable for middle to high production volumes such as engine blades and rotors.

- **MPR 2200:**
This machine is dedicated to more complex applications for the aerospace industry and the gas turbine industry.
- **MPR 3500 LDG:**
This equipment is dedicated to the shot peening of landing gear components. The robot with 4 additional external axis can treat parts with complex geometries and ensures simultaneous peening of external and internal surfaces.



MPR 1500



Inside view of the MPR 1800 shot peening cabinet



MPR 2TR700



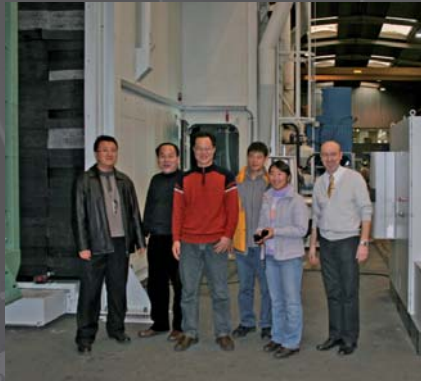
MPR 2200



MPR 3500 LDG

Peen forming applications

Wheelabrator EMP offers a major upgrade



Wheelabrator has successfully delivered and commissioned a MPF 15000 CNC peen forming machine to Beijing Aeronautical Manufacturing Technology Research Institute (BAMTRI) in August 2008.

This equipment was mainly used for the peen forming and shot peening of large aircraft components to the customer's satisfaction.

At the end of 2008, BAMTRI approached Wheelabrator with a request to upgrade the existing equipment to allow for more versatility and the treatment of a wider range of parts.

BAMTRI awarded Wheelabrator the contract after Wheelabrator carried out a complete inspection of the machine and provided BAMTRI with a detailed technical and cost analysis.

Wheelabrator recommended the following upgrades/modifications in response to BAMTRI's concerns and requirements :

- Modification of the CNC conveyor system
- Modification of the mechanical recovery, feeding and classification system
- Addition of a second off-side mounted CNC nozzle manipulator robot

- Modification of the pneumatic equipment
- Addition of a sound enclosure
- Modification of the control system to stricter requirements
- New software for the Process Computer Supervision System (PCSS)

All these modifications and upgrades will enable BAMTRI to operate a more versatile peen forming machine to satisfy its customers' various needs.

In the process BAMTRI also ordered a second closed circuit machine for its touch-up operations.

“Once again, we are extremely satisfied with the timely service provided by Wheelabrator and their full support. We have appreciated Wheelabrator's expertise and knowledge on such advanced surface preparation equipment and their availability during the whole selection process”

Mr Li - Vice Chief Engineer – BAMTRI

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