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Aircraft recycling best practice and the role of AFRA

About 12,500 aircraft are expected to reach the end of their life in the next 20 years, bringing the issue of aircraft recycling to the fore. Good practice in the field of aircraft dismantling and recycling will ensure added revenue and promote safety and environmental responsibility. The Aircraft Fleet Recycling Association (AFRA) has become the authoritative voice on the subject, and its role looks set to become increasingly important.

In three years the Aircraft Fleet Recycling Association (AFRA) has become the leading global voice in the field of aircraft dismantling and recycling. AFRA has grown from its founding 11 members to now encompass 40 members, including many key players in the aircraft end-of-life community. The organisation believes it can grow to at least 100 members within the next three to four years.

What is unique about AFRA is that its membership includes stakeholders from all the different sectors of aircraft dismantling and disassembly, from aircraft manufacturers such as Boeing to engine makers Rolls-Royce and Pratt and Whitney, to dismantlers and parts distributors including Aero Volvo, P3 Aviation, JMV Aviation, AELS and materials

recyclers such as Universal Recycling Company and ELG Metals. Within its ranks AFRA can also count innovative technology companies such as Recycled Carbon Fibre. The association also retains strong links with the academic community, encompassing the University of Nottingham's Department of Mechanical, Materials and Manufacturing Engineering, and the University of Oxford's Faraday Advanced Partnership department, in relation to researching and developing new recycling technologies.

Of the 400 to 450 aircraft that are scrapped and disassembled throughout the world annually, fully one third are parted out and disassembled by AFRA member companies. This produces upwards of 30,000



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tons of aluminium and 1,800 tons of other specialty alloy metals for recycling every year.

At the heart of AFRA's efforts is its commitment to raise the standards and instigate good practice in the field of aircraft dismantling and recycling. Martin Fraissignes, AFRA's executive director and general manager Chateauroux Air Centre, states: "AFRA has helped ensure that aircraft parts removal is now done in a much more rigorous and traceable fashion. One of our key achievements is the development of a more comprehensive approach to aircraft dismantling and recycling. We believe in and actively promote the scrapping of aircraft with a commitment to the best technical standards available. AFRA continues to promote the highest environmental and safety standards in parting out."

The backdrop to AFRA's efforts is the startling fact that approximately 12,500 aircraft are expected to reach the end of their life in the next 20 years. Some 2,500 aircraft are already parked, with the majority of these unlikely to fly again. This means that up to 25 per cent of the global fleet could be on the ground over the next generation. AFRA is determined that this large stock of retired aircraft should be dealt with in the most environmentally responsible way possible. Members are keen to ensure that the majority of these aircraft do not become an environ-

mental hazard by sitting and disintegrating in the desert.

Reference documents

One of AFRA's most significant achievements to date has been the development of its Best Management Practice (BMP) guides. The first BMP Guide, Version 1.0, dealt specifically with the best practice and minimum performance standards around airframe dismantling. The guide has 45 separate best practice elements covering a whole range of dismantling and recycling issues.

A working group with experts from a host of key AFRA member companies drew together information both from documented evidence and in "on the ground" best practice experience, in crucial areas such as the location, management processes and security of dismantling facilities, through to the keeping and maintenance of reference manuals and records, ending at the tagging and shipping of the recovered parts and the proper management of recycled material. Version 1.0 of the BMP Guide was published in August 2008. Since then it has become a reference document for those involved in airframe dismantling and recycling.

Version 2.0 of the BMP Guide was published in May 2009 and added an additional focus on engine dismantling. It offers the most up-to-date collection of recommendations con-



cerning best practices for the management of engine parts removed from aircraft during disassembly, as the engine reaches the end of its service life.

AFRA's Best Management Practice Guide Version 2.0 also gives a new and clear definition of an 'airworthiness event', setting out in detail the circumstances under which the industry feels it is appropriate to convey information about the past history of parts. The new BMP carries recommendations on how and when airworthiness events are to be reported to succeeding holders or aircraft parts, in order to enhance safety.

According to Fraissignes, Version 2.0 of the BMP guide represents "a massive step forward in expounding best practice for the dismantling and recycling of aircraft engine parts". He says: "The guide could possibly replace existing accident/incidents statements which provide little value in terms of determining the airworthiness of aircraft or aircraft parts."

AFRA is in the process of developing a series of new Best Management Practice guides, covering defaced parts, parked aircraft, electronics and avionics, and increasing aircraft recycling.

Accreditation and audits

The other major method in which AFRA drives up environmental standards and encourages best practice is through its audit and

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Approximately 12,500 aircraft are expected to reach the end of their life in the next 20 years. Some 2,500 aircraft are already parked, with the majority of these unlikely to fly again.

accreditation process. “Through the accreditation process AFRA engages with companies to demonstrate that they have the tools, training and processes to safely remove parts for re-use as they disassemble end-of-service aircraft in a safe and environmentally conscientious process,” states Bill Carberry, deputy director of AFRA and project manager airplane & composite recycling, Boeing Commercial Airplanes.

“Companies show their internal processes to AFRA’s auditing team in full confidence,” adds Carberry, explaining how they separate and demarcate parts and giving insight into how they operate their business. Once the audit team has assessed the documentation and witnessed a typical disassembly in process, the auditor can then establish if the organisation actually does what it says it will do. The auditors examine their actual practices and procedures offering advice and guidance, where needed, to reach best industry levels. The information is held securely within the audit team, fully protecting and screening the company’s proprietary information from other ‘competitors’ who hold positions with AFRA.

The audit process is a collaborative activity between the auditors and the audited company, with the auditors providing guidance and sug-

gestions in the form of corrective actions that directs the company on specific steps needed to address deficiencies. Once the initial accreditation has been completed there are two annual “compliance” audits to confirm that the processes witnessed in the initial audit are integral to the company’s regular operations. At present, eight companies have completed the programme and are fully AFRA accredited. Several others are going through the process, and a number of others are keen to get started. To date, only one company has suspended the assessment after initiating the AFRA accreditation process.

Orange Aero’s Chris Dumont believes that AFRA is in a good position to audit his company, as its membership includes so many leading industry companies. “Orange Aero has been involved in responsible aircraft engine end-of-life disassembly for a number of years and has always adopted the best industry standards. AFRA accreditation allows us to demonstrate to our customers that we meet the highest aerospace industry standards in areas not covered by other approval organisations. We are very proud to be one of the first European companies to be approved under the new

Version 2.0 of AFRA's Best Management Practice Guide."

Adding financial value

AFRA is setting new higher quality standards in the field of aircraft recycling, whilst also helping its members maximise the financial value of recycled assets. AFRA currently estimates that some 70 per cent of an aircraft can be fully recycled for both parts and materials. It believes that this could be pushed up to 95 per cent, through a combination of technological developments and wider industry use of best practice. If more of the aircraft is recycled then more financial value is accrued from each aircraft.

It has been estimated that the market for re-serviced aircraft parts has an economic value of approximately \$2bn, with half of this revenue currently coming from engine parts. However, AFRA is convinced that significantly more financial value can be obtained from the sector. If the practices within BMP guides are fully observed, for example, then fewer parts are likely to be damaged in the removal process, providing more revenue from the aircraft, this being one illustration of AFRA added revenue development.

AFRA members are now noticing that asset owners and insurance investigators are beginning to choose AFRA accredited companies to carry out dismantling. If you have industry recognised approval for your qualifications, standards and procedures, as well as acknowledged environmental integrity, while contributing to sustainability, this can become a powerful distinction in the market place. New AFRA members consistently cite the business edge they are obtaining as a key factor in joining the association.

Mike Hines, executive president of Evergreen Trade, says his company actively sought AFRA accreditation, "because it informs others in the aviation industry that we stand for integrity, environmental responsibility, and all the best management practices incorporated within the accreditation process and promoted by AFRA".

Evergreen Trade expects that the additional layer of expertise AFRA accreditation brings will be a valuable asset in its business promotion. Hines notes: "As environmental consciousness continues to rise throughout the aviation after-market sector, environmental stewardship is increasingly becoming a valuable consideration



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—Martin Fraissignes, executive director, AFRA

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“If the standing of the accreditation process rises, overall standards in the industry improve, more materials are returned to active use, which in itself bolsters sustainable practices and raises environmental standards.”

—Phil Donohue, managing director, P3 Aviation

in contract negotiations. The AFRA accreditation process assures that we are on track to meeting these requirements.”

The BMP guides also encourage the development of safety criteria throughout the supply chain, by encouraging aircraft disassemblers or asset owners to proactively discover whether an aircraft or aircraft part has been involved in an airworthiness event relating to unusual heat, stress or abnormal environmental conditions.

Driving technological innovation

In its determination to improve practice within the industry, AFRA has taken the lead in both developing cutting edge technology and supporting industry and academic research efforts around recycling technology. The association and some of its members, such as Boeing, are supporting technological initiatives to increase the amount of materials recovered from aircraft. One current project is examining how to recycle more aircraft interiors. Members are also developing new technologies in order to recycle more carbon fibre as well as maximising the re-use of carbon fibre off-cuts which emerge from the production process. Reclaiming increased amounts of composites, which can then go into high value applications, is another research initiative which involves AFRA members.

The association’s members are also involved in developing innovative processes which will help in recovering more of the precious metals present in aircraft parts. Another

project consists of developing processes to aid aluminium alloys detection, which will aid material separation and so add value to the materials recycled. Many of these innovative developments are being pursued through technological partnerships involving AFRA members.

The economic downturn has brought a number of challenges to those recycling aircraft materials. The drop in commodity metal prices has currently decreased margins. Asset owners may choose to hold on to their assets in the hope that market prices bounce back, before allowing aircraft to be dismantled and recycled. A host of materials have the potential to be recycled once the aircraft reaches the end of its working life, ranging from precious metals, high temperature alloys, non ferrous metals and stainless steel.

The majority of the 25 per cent of an aircraft that is yet to be recycled are interior materials; plastics, composites and textiles. The specific needs of the aircraft recycling community have been recognised by AFRA. New technologies are being considered to improve the rate of plastic recycling, and partnerships with a number of specialist recycling companies are being pursued by AFRA members. The environmental costs of delaying recycling are also being increasingly cited by members and increasingly accepted by the wider industry.

Pursuing best practice — engaging regulators

AFRA has not shied away from tackling difficult regulatory and legislative issues. Members have



argued that the current regulatory framework around parts involved in ‘incidents’ or involving ‘non-incident statements’, remains unclear and is reliant on different and wildly contrasting definitions by diverse international bodies.

AFRA board members have also initiated meetings with officials from key regulatory bodies such as FAA, EASA and ICAO, to explore the possibilities around AFRA best management practice guides receiving greater official recognitions. Members are keenly aware that industry needs to take a leading role in any regulatory or legislative developments, impacting on the dismantling and recycling sector.

According to Phil Donohue, AFRA treasurer and managing director of P3 Aviation, the association needs to actively engage the regulatory

authorities so as to ensure that the authorities concerns and opinions are fully represented in the BMP guides. He says: “If the standing of the accreditation process rises, overall standards in the industry improve, more materials

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are returned to active use, which in itself bolsters sustainable practices and raises environmental standards.”

Partnership, collaboration and defining the future

The combined industry experience of AFRA is encouraging different kinds of partnerships and collaborations among AFRA members. Members’ activities facilitate collaborations, through maximising business opportunities or developing creative partnerships.

AFRA remains determined to lead the debate on all aspects of aircraft dismantling and recycling, be these technological, environmental or regulatory. It is no accident that AFRA’s tag-line is “defining the future”. ■

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