

AFRA Panel: R&D for EoL

Dale Smith, Boeing Commercial Airplanes

Ayce Celikel, ENVISA

Alasdair Gledhill, ELG Carbon Fibre Ltd.



R&D Committee – Goals

- Advance AFRA’s strategic goals – namely achieving **greater component recovery** and material recycling for the industry and promoting **innovation in recovery and recycling technology**
- **Support research** that encourages third parties to develop and promote economic incentives for recycling and encourages design for disassembly and recyclability for new aircraft
- Position AFRA as the **go-to resource** for industry information



R&D Committee – Recycling Metric Project

- Beginning in Q1 2019, AFRA embarked on its first funded research project, working with ENVISA to develop a aircraft recycling metric.
- Committee is working closely with ENVISA to bring this project to completion at the end of September.



R&D Committee – Research Network

AFRA is developing a **network of research partners**, who are invited to participate alongside the R&D Committee to contribute research content and expertise to advance the aircraft end-of-life industry

- Clausthal University of Technology
- Pforzheim University of Applied Sciences
- Fraunhofer Institute for Chemical Technology
- University of Pittsburgh
- Envisa
- Adherent Technologies, Inc.
- Ryerson University
- Delft University of Technology (TU Delft)
- Federal University of Rio de Janeiro
- Fundación CIDAUT
- Embry-Riddle Aeronautical University
- Utrecht University
- Rochester Institute of Technology
- XCrusher



R&D Committee – Participants

Derk-Jan van Heerden	AELS BV
Iso Nezaj	AerSale, Inc.
Dale Smith	Boeing Commercial Airplanes
Richard Trach	Boeing Commercial Airplanes
Julien Dezombre	Bombardier Aviation
Kahina Oudjehani	Bombardier Aviation
Miguel Garcia Claro	Bombardier Aviation
Brent Webb	CAVU Aerospace, Inc.
Kenneth Kocialski	CAVU Aerospace, Inc.
David Murphy	ComAv Asset Management
Carlos Grandi	Embraer-Empresa Brasileria Aer. S.A.
Nathan Hymel	Mastermelt
Sebastian Jeanvre	MoreAero GmbH
Russell Stratton	Pratt & Whitney
Michael Roth	ROTH International GmbH
Kevin Flynn	VAS Aero Services LLC



AFRA's Annual Data Collection Report

- New program initiative with the goal of providing continued valued to the membership and industry.
- AFRA partnered with **Association Research, Inc. (ARI)** to conduct an annual survey to collect the number of aircraft disassemblies that took place in 2018.
- * All responses were kept confidential and collected solely by ARI.
- * The final report will be shared exclusively to those that participated.



AFRA Annual Data Collection - Sample Report

Participant Profile

		Number of Companies	Number of Planes	Percent of Responses
All Respondents		4	43	100.0%
Model	Boeing	4	20	44.4%
	Airbus	4	16	37.0%
	Other	3	7	18.5%
Body Type	Wide body	4	8	22.2%
	Narrow Body	4	28	59.3%
	Regional	3	7	18.5%
AFRA Accredited	Yes	4	42	95.8%
	No	1	1	4.2%
Location of Disassembly	North America	2	5	14.3%
	Europe	4	38	85.7%
Location Last Operated^x	North America	1	1	3.9%
	Europe	4	26	58.8%
	Other	4	15	37.3%
Engineⁿ	Pratt & Whitney	3	7	17.9%
	Rolls Royce	3	4	12.5%
	CFM	4	21	44.6%
	IAE	2	8	17.9%
	Other	1	3	7.1%
Freighter^x	Yes	1	2	6.3%
	No	4	41	93.8%

AFRA Annual Data Collection - Sample Report, Cont.

Stats by Airplane Model

		Number of Companies	Number of Planes	Parking Time*		Disassembly Time**		Age of Aircraft***	
				Average in Days	Median in Days	Average in Days	Median in Days	Average in Years	Median in Years
All Respondents		4	43	52.8	28.0	89.4	46.0	19.6	18.5
Model	Boeing	4	20	55.2	22.5	79.6	42.0	22.3	20.4
	Airbus	4	16	57.8	44.0	95.1	77.0	16.4	17.2
	Other	3	7	34.4	10.0	105.0	110.5	18.9	19.8

Stats by Body Type

		Number of Companies	Number of Planes	Parking Time*		Disassembly Time**		Age of Aircraft***	
				Average in Days	Median in Days	Average in Days	Median in Days	Average in Years	Median in Years
All Respondents		4	43	52.8	28.0	89.4	46.0	19.6	18.5
Body Type	Wide body	4	8	23.5	8.0	167.2	172.5	21.4	21.5
	Narrow Body	4	28	65.8	33.0	66.1	42.0	19.2	17.9
	Regional	3	7	34.4	10.0	105.0	110.5	18.9	19.8

Stats by AFRA Accreditation

		Number of Companies	Number of Planes	Parking Time*		Disassembly Time**		Age of Aircraft***	
				Average in Days	Median in Days	Average in Days	Median in Days	Average in Years	Median in Years
All Respondents		4	43	52.8	28.0	89.4	46.0	19.6	18.5
AFRA Accredited	Yes	4	42	54.0	29.0	88.1	46.0	19.7	18.6
	No	1	1	ISD	ISD	ISD	ISD	ISD	ISD

AFRA Annual Data Collection - Sample Report, Cont.

Stats by Location of Disassembly

		Number of Companies	Number of Planes	Parking Time*		Disassembly Time**		Age of Aircraft***	
				Average in Days	Median in Days	Average in Days	Median in Days	Average in Years	Median in Years
All Respondents		4	43	52.8	28.0	89.4	46.0	19.6	18.5
Location of Disassembly	North America	2	5	ISD	ISD	ISD	ISD	ISD	ISD
	Europe	4	38	59.7	35.5	79.2	42.0	19.6	18.6

Stats by Location Last Operated

		Number of Companies	Number of Planes	Parking Time*		Disassembly Time**		Age of Aircraft***	
				Average in Days	Median in Days	Average in Days	Median in Days	Average in Years	Median in Years
All Respondents		4	43	52.8	28.0	89.4	46.0	19.6	18.5
Location Last Operated	North America	1	1	ISD	ISD	ISD	ISD	ISD	ISD
	Europe	4	26	64.8	31.5	68.7	42.0	20.1	18.6
	Other	4	15	33.8	8.0	128.7	133.0	18.5	17.2

Stats by Engine Type

		Number of Companies	Number of Planes	Parking Time*		Disassembly Time**		Age of Aircraft***	
				Average in Days	Median in Days	Average in Days	Median in Days	Average in Years	Median in Years
All Respondents		4	43	52.8	28.0	89.4	46.0	19.6	18.5
Engine	Pratt & Whitney	3	7	13.0	0.0	143.2	132.0	23.3	24.0
	Rolls Royce	3	4	17.3	0.0	203.3	208.0	22.2	22.1
	CFM	4	21	30.5	25.0	75.2	42.0	20.5	18.2
	IAE	2	8	ISD	ISD	ISD	ISD	ISD	ISD
	Other	1	3	ISD	ISD	ISD	ISD	ISD	ISD

Stats by Freighter

		Number of Companies	Number of Planes	Parking Time*		Disassembly Time**		Age of Aircraft***	
				Average in Days	Median in Days	Average in Days	Median in Days	Average in Years	Median in Years
All Respondents		4	43	52.8	28.0	89.4	46.0	19.6	18.5
Freighter	Yes	1	2	ISD	ISD	ISD	ISD	ISD	ISD
	No	4	41	53.2	28.0	89.4	46.0	19.1	18.2

Questions/Discussion

