



International Bureau of Aviation
Minimising Risk - Maximising Opportunity

Annual Review 2015

Widebodies, the secondary market, maintenance costs and redeliveries



Strategic
Partner



Annual review 2015

Welcome to IBA's annual review. We've condensed some of IBA's ideas and thought leadership throughout 2015 into an easy-reference format and you have:

1. Widebody valuations – takeaways from our B777 investor day
2. The secondary market – the acceleration of retirements and obsolescence
3. Maintenance costs – managing a bigger slice of the costs cake
4. Redeliveries – a summary of our whitepaper, with a closer look at engines

We hope it's useful and don't hesitate to contact me at phil.seymour@ibagroup.com or the team at marketing@ibagroup.com with any feedback, queries or requests.

It's never dull in aviation and 2015 was no different.

The continued low oil price which, for the short term at least looks set to remain below \$50* a barrel, continues to assert its influence on the industry.

Cheap oil lowers costs and (provided fares are lowered as a result) strengthens demand which is reflected in the record profits and margins across the industry. Older, less efficient aircraft become more appealing in the short-term and operators are able to explore their route boundaries without starting a price war.

Fuel hedging policies continue to hurt those stuck in the past although many are not choosing to take advantage by lowering fares whilst demand remains so strong. In turn they are choosing to act more rationally which can be considered to be unusual behaviour in its own right... by buying out leases or paying down debt, rather than extending the already-too-long backlogs.

In the US our American friends also benefited from the stronger dollar and the resulting 20%+ margins for airlines, a figure that we didn't think we would see again.

The lower fuel prices have resulted, amongst our clients at least, in increased attention on maintenance costs which now represent a bigger than ever slice of the overall operational costs cake. It was probably 2007 when we last saw this level of focus.

Whilst some older aircraft remain in service for a little longer, rising maintenance costs and falling reliability will kill them off eventually, regardless of how cheap fuel becomes. You can't ignore the combined 12,000+ aircraft backlog held by Airbus and Boeing.

2015 has also been interesting year for regional upheaval with airline casualties in Russia and Malaysia, the Chinese economy suffering some setbacks during the summer, and India showing significant demand increases so soon after many lessors suffered under the collapse of Kingfisher. However, whilst the headlines may give cause for concern, for anyone that has actually travelled through India and China, the demand for air travel is undeniable.

Operating leasing as a financial solution shows little sign of slowing down in the short term, although any prolonged twin aisle value retention issues will focus the minds of the lessors onto more liquid assets that offer lower risk during the transition phase. With close to 10,000 single aisle still yet to deliver and rate increases only around the corner, there shouldn't be a shortage of opportunities!

At the other end of the spectrum, we saw the C919 roll-out of the factory and the MRJ take to the skies after considerable delays. Whilst these initial offerings may not make much of a dent in the overall fleet in the short term, they do herald new entrants to the market that will shape OEM strategy going forward.

Both of these aircraft will also benefit from the latest engine technology to be used on the A320neo, B737MAX, Embraer E2, CSeries, Irkut's MC21, and the planned Superjet NG, illustrating just how engine developments for single aisle aircraft of all sizes are narrowing to include just the Pratt & Whitney GTF or CFMI Leap families. Similarly, twin aisle technology appears to be pushing towards the more simplified Airbus/Rolls-Royce and Boeing/GE combination model.

It remains an exciting time for operators with an unprecedented amount of new kit coming to the market in such a short time considering how long it has been since the last big changes. This may not be a feeling echoed by the lessors and financiers who will be preparing for the inevitable drop in demand for current types.

Much of the origins of modern leasing dates back to the late 1980s/early 1990s at the advent of the last major technology push which saw eight major types enter the market space. Within this decade we will witness the entry of nine major types, starting from the B787 to the B777X and with production rates reaching all new heights – the way in which aircraft are financed or leased will be an interesting space to watch!

Phil Seymour, Chief Executive Officer
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Widebody valuations - takeaways from our B777 investor day

While Delta’s Q3 earnings pronouncement that you could get a B777 for \$10m might not have started the discussion around widebody values, it certainly accelerated it. Since October, speculation has increased in the investment community around softening valuations of B777s and A330s. As a result, Airline Economics and IBA held an investor day to discuss and debate the investment and secondary market opportunities of the B777 and other twin aisle aircraft. Here are the highlights.

As the table shows, the B777 has been a formidable success. With over 1300 delivered and 500+ on backlog, it’s the most successful twin-engined widebody built in terms of numbers in operation and is operated by most of the major flag carriers.

Boeing B777. A very successful aircraft

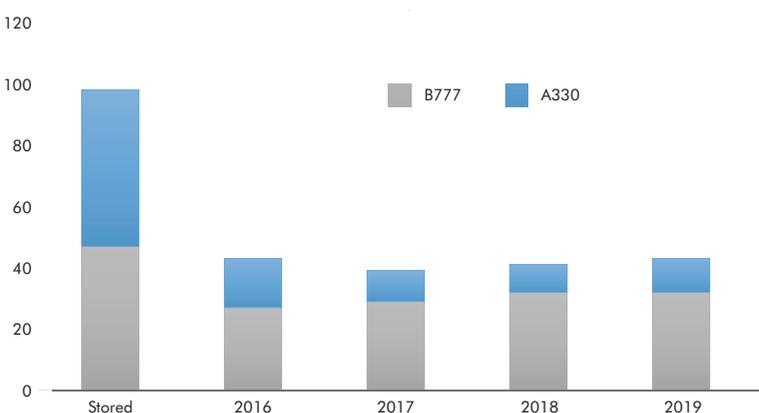
Variant	Engine	Net Order	Delivered	Backlog	Active	In SVC/ST	Destroyed	Retired	Av/Age	Stored	Stored %	Av/Age @ RT
777-200	RR	16	16	-	13	14	-	2	17.56	1	7%	17.14
	GE	9	9	-	8	8	-	1	-	-	0%	-
	PW	63	63	-	57	59	-	4	-	2	3%	-
777-200ER	RR	168	168	-	133	160	3	5	14.12	27	17%	16.77
	GE	161	161	-	156	157	-	4	-	1	0%	-
	PW	93	93	-	86	91	2	-	-	5	5%	-
777-300	RR	42	42	-	37	42	-	-	14.78	5	12%	17.00
	GE	-	-	-	-	-	-	-	-	-	0%	-
	PW	18	18	-	16	16	-	2	-	-	0%	-
777-200LR	GE	59	59	-	57	59	-	-	6.32	2	3%	-
777F	GE	160	117	43	117	117	-	-	3.46	-	0%	-
777-300ER	GE	788	608	180	605	608	-	-	4.66	3	0%	-
777X	GE	306	-	306	-	-	-	-	-	-	0%	-
		1883	1354	529	1285	1331	5	18		46		

However, it’s not all “plane-sailing”... A clear takeaway of the investor day was that the B777, especially in 200/200ER guise, is proving more difficult to move on.

A look at twin aisles coming off lease shines the light on one particular contributor to investor concerns. By the end of 2019, there will be over 160 aircraft scheduled to come off lease, the majority of them Boeing. Looking beyond volumes, the age of aircraft at redelivery is also important. In this case the A330 has seen some relatively young redeliveries.

Currently over 30 200ERs are parked with a strong bias towards Rolls-Royce powered aircraft either because of re-fleeting decisions such as those made by Singapore or Emirates, or because airlines head into financial difficulties like Transaero and MAS.

Twin aisles coming off lease



Delta is a relative minnow in terms of current B777 fleet.

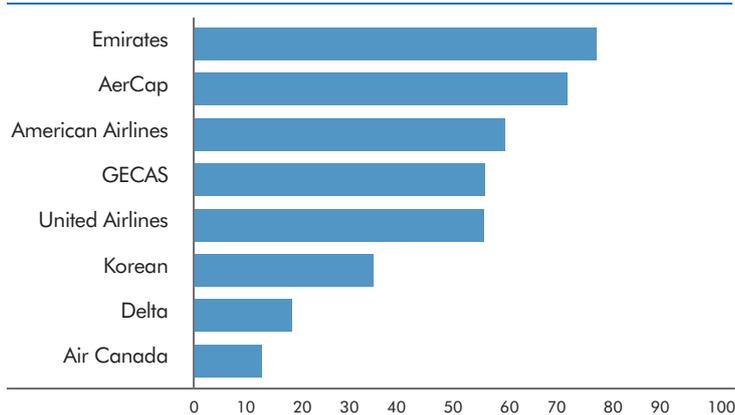
Are they looking for used bargains, or driving down the price of new kit?

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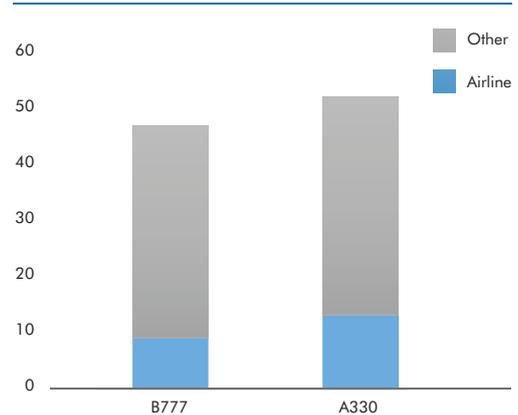
Widebody valuations - takeaways from our B777 investor day

Looking at various B777 owners, it's quickly apparent that Delta is a relative minnow in terms of current B777 fleet. What is less clear is whether they are looking for used bargains, driving down the price of new kit, or both. Market-moving rhetoric aside, the feeling from the investor day was that \$10m (for a runout aircraft needing \$25m spent on engine overhauls and reconfiguration) was a lot closer to the appraiser half-life value than many had anticipated.

B777s by owner



B777s by owner type



Looking at the values

- Demand and values for the B777 classics are softening now.
- B777 fleet remains concentrated with 50% of the fleet being operated by just nine operators, 75% by 19 operators. The lessor fleet is even more concentrated with the top 10 invested in 70% of the fleet.
- The number of secondary trades remains very low compared to other twin aisle aircraft.
- The B777 programme arguably suffers from too much fragmentation with 11 different variant/engine combinations, although the 300ER has simplified this approach.
- The 300ER and A330 are strong today but will face pressure in the future as history is likely to repeat itself as it has done with the previous generation of twin aisles.
- The pace of removal of B777s from passenger service is expected to hit 400 cumulatively within 10 years – over half coming from the 200/200ER.
- Values for the 200ER have seen rapid decline in recent years with age having relatively little effect on trading appetite – last off the line effect.
- The potential downside risk for the 200ER remains considerable.
- 250 potential delivery slots for the 300ER still available before the B777X enters service which highlights potential pricing softness to generate interest. We wait to see if Boeing production rates will be further adjusted down, or if a couple of very big orders come in from the likes of Delta once they have managed Boeing's price expectations, as that would justify keeping production rates as the current levels.

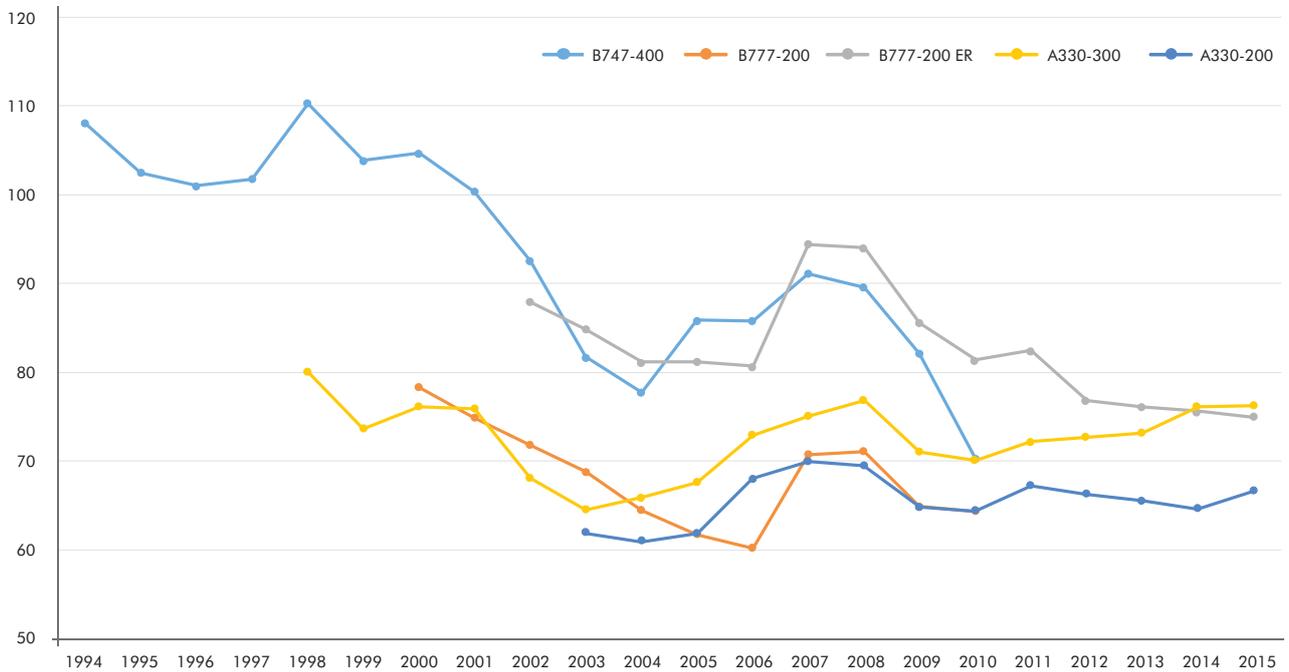
While aircraft stored is equally balanced between A330 and B777, there are over 160 coming off lease in the next four years, the majority of them Boeing.

Looking beyond volumes, the age of aircraft at redelivery is also important. In this case the A330 has seen some relatively young redeliveries.

Continues

Widebody valuations - takeaways from our B777 investor day

CMVs for five-year-old aircraft



What are the barriers?

A few B777s are finding homes but the sheer size of the aircraft and cost of operations are barriers to some. Widebodies only work efficiently on long haul routes with healthy load factors and if these elements are absent, it knocks out a number of potential customers.

The market needs to adapt and move away from traditional operating leasing for ageing widebodies to possibly offer a power-by-the-hour servicing approach to use up green time more efficiently within the fleet and give airlines access to useful lift when required.

The retiring B747 fleet is an opportunity to find new homes for B777s. However on the investor day, it was felt the 300ER type was the more natural replacement.

Engine overhauls and reconfiguration costs are critical to decision making, as is lead time and these issues must be taken into consideration.

In terms of new markets, only Iran was mentioned as a possible home for B777s as sanctions relax.

Continues

Widebody valuations - takeaways from our B777 investor day

The conclusions of the day included:

1. The B777, especially in the guise of the 300ER, is a great aircraft and flown by most flag carriers yet its size means the number of secondary market homes is more limited.
2. The B777-200s have some pressure points such as unscheduled Transaero and MAS inventory as well as scheduled Emirates and SIA redeliveries.
3. The potentially expensive (circa \$20m+ per aircraft) issues of engine refurb/engine enrolment to OEM programs and their reconfiguration were discussed. As well as the expense, the reconfiguration suffers from lead time issues – it can take up to two years to change from a high-end branded 3 or 4 class config to, say, a 2 class config when taking into account the approval of engineering modifications and supply of seats.
4. Even assuming the engine and reconfig issues are solved, where is the demand for these used aircraft? On investor day, no-one had a strong argument for demand that would take, for instance, 40 aircraft out of the pool.
5. The opportunities for placement that do exist require 10+ aeroplanes (eg Delta) this not only drives the price down, but makes it more difficult for the lessor with 1-2 aircraft available for transition.

The economic life of an aircraft is getting shorter and there was agreement that a reset in the understanding of risk might be necessary in future. The poor residuals currently being debated might ultimately lead to higher lease rates if the economic life concept is put into question.

For further information, please contact **Stuart Hatcher**, Chief Intelligence Officer:
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The secondary market – the acceleration of retirements

In September IBA looked at a variety of trends within the secondary market for investors. With Delta's talk of \$10m B777s, there has been a lot of focus on used values. Our key conclusions included:

- Retirements accelerating. It's increasingly rare to see aircraft older than 25 years in service; and
- Liquidity & Demand is a very mixed picture. Variants, engines and, on the larger kit at least, reconfiguration costs are all contributors to extra care needing to be taken pre-investment.

Retirement Trends. Are aircraft retired earlier than before?

Generally speaking, IBA would say that there seem to be more occurrences of aircraft being retired at less than 25 years of age than ever before. While there are always exceptions...



When Delta finally retired its DC-9-50s in January 2014, the average age of those aircraft was 36 years.



Yet in 2011 we saw 7 year old ex-easyJet Boeing B737-700s being retired for part-out.

... the average age of retirement is creeping down. Previous generations of aircraft often saw 30 years' service plus, either as passenger aircraft, or in a secondary role as a freighter/corporate jet etc.

A generalisation admittedly – but we do seem to be seeing more cases of aircraft being retired by the first operator – and not finding homes with second operators – instead they are being sent straight to the retirement centres for part out. However, saturation and resulting falls in market prices for parts can also restrict this as being a viable option once more than around 5-10% of the fleet has been parted out.

Some Practical Examples

- By the time BA had transitioned its Boeing B737-200s in 2001 – all were placed with another operator. When BA retired its Boeing B737-400s in 2013 - 2015, all went to Victorville apparently for part out.
- When Cathay Pacific transitioned its Boeing B747-200s/300s, just about all were placed – either with the likes of Air Atlanta Icelandic/PIA Pakistan – or converted to freighters. By comparison – practically all Cathay Pacific B747-400s retired over past two years have gone straight for part out.
- When KLM retired its last DC-10-30s circa 1994 – some were over 20 years old but all were placed with Kras Air, Continental/Northwest. Some were well over 30 years old when parted out. In comparison, all 10 KLM MD-11s, delivered between 1993 and 1996, were retired for part out between 2012 and 2014, often under 20 years of age.
- When Lufthansa retired its DC-10s circa 1993, all were placed: with SN, Zambia Airways, and then further placements with Omni, Gemini, World and Kelowna. By comparison, of the 10 Lufthansa A340-300s so far retired by the airline – 6 have gone for part out with the remainder going to Mahan Air or Deutsche Lufthansa.

Continues

The secondary market – the acceleration of retirements

Retirement statistics for key models.



Model:	A320 family
Estimated retirements:	178
Average age (years) at retirement:	19.2
Oldest retirement:	26.16
Youngest retirement:	10.13



Model:	A330/340
Estimated retirements:	52
Average age (years) at retirement:	16.6
Oldest retirement:	21
Youngest retirement:	11.57



Model:	Boeing B737-700
Estimated retirements:	31
Average age (years) at retirement:	12.9
Oldest retirement:	17
Youngest retirement:	7



Model:	Boeing B747-400/M/D
Estimated retirements:	120
Average age (years) at retirement:	21
Oldest retirement:	26
Youngest retirement:	16



Model:	Boeing B767
Estimated retirements:	47
Average age (years) at retirement:	23
Oldest retirement:	29
Youngest retirement:	18



Model:	Boeing B777
Estimated retirements:	18
Average age (years) at retirement:	16.4
Oldest retirement:	19
Youngest retirement:	12

The secondary market – the acceleration of retirements

Current generation liquidity

Looking first at narrowbodies, the most liquid models are the Boeing B737-800 and later specification Airbus A320-200s as the 160-189 seat narrowbody market is the most popular. Less liquid models include Boeing’s B737-600, which is a shrink of the B737-700 and therefore more of a niche product with a reduced market, and Airbus A318 which is also a shrink with less demand.

Liquid narrowbodies			
Model	How many?	Positives	Negatives
Boeing B737-800	3,800 aircraft / 170 operators	Usually easily placed, single engine supplier	Spec is has huge impact on value
Airbus 320	A320 – 3,850 aircraft / 260 operators	Wide operator base. Strong commonality	IAE V2500-A1 powered aircraft not as attractive. Lease rates can be volatile
Embraer 190	520 aircraft/ 45 operators	Strong lessor interest, less susceptible to oversupply during downturns	Overhaul cost of GE CF34-10E series is high, as is reconfiguration cost relative to the size of the aircraft
Illiquid narrowbodies			
Boeing B737-600	60 aircraft/ 5 operators	Close affinity with more popular B737-800. Potentially high value/ high demand parts from low stress -7B20 engines popular with part out companies	Shrink aircraft often too heavy, narrow market, strong competition

Moving onto the larger kit, from a fleet size and operator base perspective, Airbus A330-200 and Airbus A330-300 as well as Boeing B777-300ER and Boeing B787-8 and Airbus A350-900 are all moving well. However each have their challenges.

IBA would suggest that perhaps the Boeing B747-8I, and Airbus A340 are in a softening position, despite the lower fuel price relaxing pressure on four-engine aircraft. Additionally the Boeing B777-200 is seeing values soften as a result of more limited secondary market.

The secondary market – the acceleration of retirements

Liquid widebodies			
Model	How many?	Positives	Negatives
Airbus A330-200	535 aircraft/ 70 operators.	Recent placements of used aircraft to Syphax, TAME etc.	Part-out industry emerging for this model and it seems more are likely to follow
Airbus A330-300	590 aircraft/ 60 operators	Strong demand continues for new aircraft; especially in growing Asian markets	Large technical differences in terms of operating weight and range capability between models. Last of line aircraft so likely to face value pressure
Boeing B777-300ER	600 aircraft/ 36 operators.	Benchmark long haul product. Strong lessor interest. High quality operator base	Large fleets at Emirates, Cathay Pacific, Air France. High reconfiguration costs
Airbus A350-900	Circa 10 aircraft with Qatar, Finnair and Vietnam Airlines but backlog of over 580 aircraft	Latest technology and latest efficiencies, Strong lessor interest. Large replacement opportunity. Lots of operators & lessors committed	Strong competition from Boeing B787
Boeing B787-8	290 aircraft/ 30 operators – Backlog - 205 aircraft	Latest technology and latest efficiencies. Strong lessor interest. Large replacement opportunity. Lots of operators & lessors committed	EIS challenges. Lessors interest migrating towards B787-9s. Some early models had weight or engine disadvantages
Illiquid widebodies			
Boeing B747-8 Intercontinental	30 aircraft/ 3 operators – Backlog – 15 aircraft	Latest technology engines, High quality operator base	Limited re-marketability, Uncertain residual value profile
Boeing B777-200	81 aircraft/ 10 operators	High quality, committed, operator base	Little appeal in the used market
Airbus A340-500	27 aircraft/ 4 operators	Excellent range capability	Small operator base and many of them retiring fleets

The secondary market – the acceleration of retirements

Demand for secondary leases and used aircraft sales

Narrowbodies

- Strong demand exists for secondary market leases with aircraft such as the Boeing B737-800 and Airbus A320 types. For example, the ex-Air Berlin Boeing B737-800s rapidly found homes.

But what about smaller aircraft such as Boeing B737-700s and Airbus A319s?

- In the case of Boeing B737-700s, there has been a substantial amount of part-out activity, but Southwest Airlines has dominated many of the recent operator-to-operator transactions.
- Lessors report a slight firming up of Boeing B737-700 values and lease rates with Southwest influencing the used market recently. IBA counts at least 39 Boeing B737-700s heading to Southwest.
- Ex-easyJet Airbus A319s seem popular in the used market.

Widebodies

Transactions are occurring – with Boeing 757-200s B767-300ERs proving popular as passenger to freight conversion.

However, there is a mixed picture on B777s.

- B777-200/200ERs some will head for part out whilst others will make attractively priced lift for airlines in the charter and wet lease markets.

For further information, please contact Owen Geach, Chief Commercial Officer:
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Maintenance costs – managing a bigger slice of the operational costs cake

As the oil price continued to slide in 2015, increased attention has been paid to MRO costs, from both an ongoing perspective and as part of a redelivery or shift to a new operator. MRO also hit the mainstream media, with Vanity Fair penning a curious article on outsourced maintenance and the FT highlighting the EC's inquiry in to the global maintenance market and long term contracts. IBA believes this to be associated with the OEM offerings for new aircraft and engines being tied into future maintenance contracts, thus creating restrictions on future trading and lack of open market options.

Alongside being eminently more controllable than fuel costs, maintenance costs now represent 20-25% of an airline's direct operating costs, depending on the specific aircraft fleet age, utilisation and operational influences. The impact on maintenance costs is twofold – not only is there more attention on them from the finance department, lower fuel costs also keep older, less efficient, aircraft airborne - leading to additional maintenance and costs.

A few decades ago, an aircraft was delivered new to an airline and stayed there until it was scrapped. That's rarely the case today and finance or operating leases may see the aircraft having numerous airlines responsible for maintenance over its lifespan.

Managing aviation costs is incredibly complex, the variables include: the operator, the environment, the utilisation, the hour/cycle ratio, the operational profile (de-rated thrust, weights), man-hour rates, workmanship, representation whilst on check, warranties, support contracts, airframe, engines, rotables, APU and landing gear.

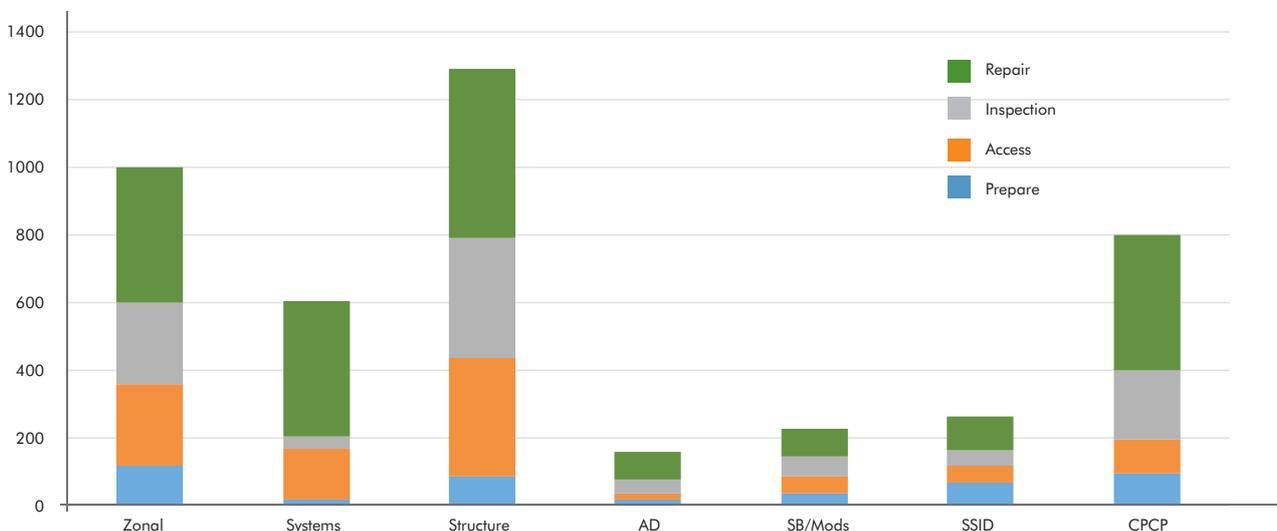
With so many fluid elements, benchmarking maintenance costs can be a very effective means of maximising efficiencies and monitoring expenditure. Typically, operators require input around:

- Identification of areas for improvement;
- Contract negotiations – improved visibility on expenditure; or
- Formulation of maintenance cost spend metrics (FH/FC) and KPIs

The drivers of increased focus are several: fleet and contract renewal, M&A activity, fleet optimisation requirements, or a change in maintenance structure, are the most frequent.

Improving predictability is another key challenge for operators. Time and again we see airlines surprised by costs or underestimating outlay. Better planning and forecasting equals improved cashflow and fewer surprises.

Today's landscape and options



Continues

Maintenance costs – managing a bigger slice of the operational costs cake

The key to any maintenance forecast is establishing as accurately as possible how much work will be required once the standard inspections have taken place.

In addition to maintenance costs – reconfigurations continue to cause nasty surprises at changeover. These costs are often even less well defined than MPD/redelivery costs as they are driven by commercial and marketing departments, not by airworthiness.

There are often huge variations in spec and cost between national carriers and the third tier operators.

With no standard layout, particularly in widebodies, galley and toilet monuments are more frequently being moved around, adding significant cost. Whether an upgrade to an existing aircraft, or a refit for the next operator, IBA has been involved in discussions between parties over:

- Seats
- IFE - (In Flight Entertainment)
- Premium economy products
- First Class/Suites upgrades
- In seat power
- AVOD
- Personal device interaction
- Wi-fi

Typical reconfiguration costs

	A330/B777 Range		A320/B737NG Range	
	Low	High	Low	High
Economy Seating	750,000	1,500,000	250,000	450,000
Business Seating	750,000	2,000,000	150,000	300,000
Carpets/dividers	50,000	125,000	25,000	75,000
Galley/Carts/Inserts*	1,200,000	1,600,000	200,000	350,000
Lavatories**	1,500,000	2,250,000	550,000	800,000
Wardrobe/Closets	120,000	175,000	N/A	N/A
IFE	2,250,000	3,000,000	750,000	1,500,000
Nitrogen Generation System	400,000	450,000	350,000	400,000
Total	7,020,000	11,100,000	2,275,000	3,875,000

* 6 in a widebody, 3 in a narrowbody

*All amounts are in US dollars

** 8 in a widebody, 3 in a narrowbody

Reconfigurations are rarely part of the usual maintenance reserves that lessors accrue and it is often these costs that negatively impact delivery to the next lessee. Costs aside, reconfigs can take 12months+ to implement so again require meticulous planning.

For further information, please contact Phil Seymour: phil.seymour@ibagroup.com

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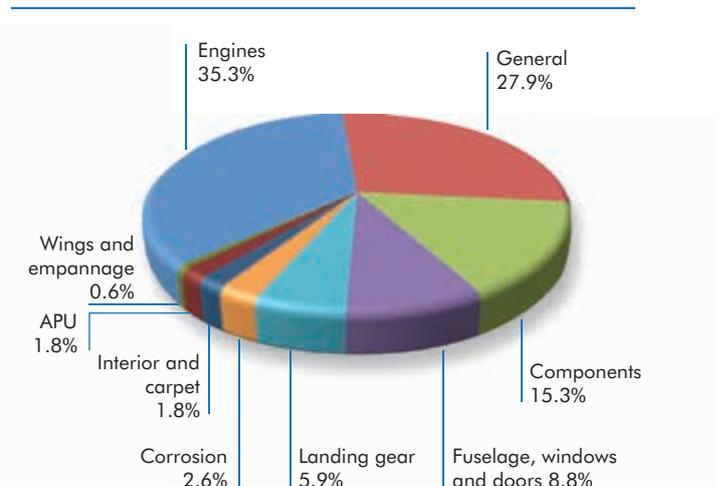
Redeliveries – A summary of our whitepaper, with a closer look at engines

IBA has been central to the process of redelivering aircraft from airlines to lessors for almost 30 years. We have worked across all elements of that process, assisting lessors, advising the airlines and informing financiers. In October we published a whitepaper around managing redelivery costs with the following conclusions:

1. The estimates of global MRO expenditure appear to underestimate the real costs incurred by lessees and, in some cases, lessors since additional tasks are created by the redelivery process.
2. Many lessees can do a more efficient job of the redelivery process but it requires greater focus and specialist resources.
3. The process of redelivery planning should start much earlier than is often the case and, in terms of the contractual requirement, actually start at the initial negotiation of the lease, not afterwards.
4. Accrued maintenance reserves may be used in part towards the additional costs shown below, however, the maintenance reserves negotiated may not relate adequately to the full cost. Those maintenance reserves should be compared to IBA benchmarks.
5. IBA's process of "fly forward" analysis and maintenance planning reviews will provide a much clearer picture of the actual additional costs that will be incurred on a specific aircraft and lease combination.

The whitepaper highlighted that an inefficient redelivery results in an average overspend of \$1.65m per single aisle aircraft. Given the number of returns per year – IBA's JetData database recorded 895 lease returns in the last 12 months – the benefits from improvements are clear. For a two engine twin aisle (B777/A330) aircraft this cost is estimated to be over \$3m. For turboprops and regional jets (ATR/ERJ) it is in the order of \$0.5m per redelivery.

Average additional maintenance costs across typical leasing areas



Whilst the whitepaper highlighted that it is the engines that are a significant element of that additional cost, no area is left unchallenged. Structural repairs, modifications and component certification are other areas that often cause problems for the lessee to adequately show compliance with the lease conditions.

The process of aircraft redelivery is frequently and significantly underestimated by the lessee. Increasingly, many of the stipulations required by lessors through the negotiation of the redelivery conditions go beyond the standard requirements and airworthiness tasks that the manufacturer's Maintenance Planning Document (MPD) typically requires. We contend that many industry estimates of Maintenance, Repair and Overhaul (MRO) costs are underestimating the quantity of actual work that is driven by operating leases. With operating leases on the increase, IBA suggests that the demand for MRO services related to end-of lease reviews is currently underestimated by at least 10-15%.

Continues

Redeliveries – A summary of our whitepaper, with a closer look at engines

Tighter control on redelivery planning and costs will have a positive impact on cashflow. However, the control and planning required is often misjudged by the lessee, in part purely as a result of the key date being far in the future. Indeed, IBA is only half joking when, in response to the question: “When should we focus on redelivery?” we reply with “the day you begin to negotiate the delivery”.

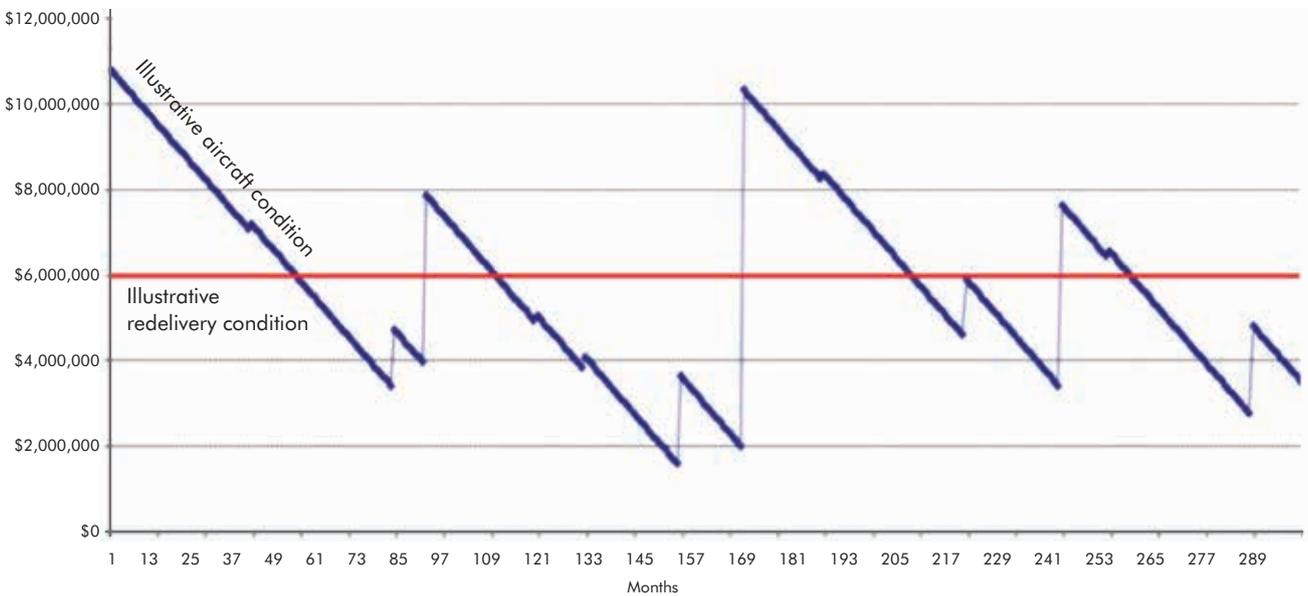
The skillset required of airline maintenance and technical staff for a redelivery is slightly different to the day-to-day requirements of the airline and its regulatory authority. With lessees focused on their core revenue generating, operational and airworthiness matters, it is prudent to seek additional opinions on the optimal processes relating to redelivery.

The follow up is primarily for lessees to increase focus. There is plenty of expertise but that expertise may well lie outside of their in-house technical teams who are, quite rightly, focused on the day-to-day airworthiness matters.

Timing is everything

As the fly-forward analysis below illustrates, the redelivery condition is seldom, or rather never going to be, arrived at without considerable planning since the actual condition of the aircraft is constantly changing as per the operational and maintenance cycle. Work will be performed via airframe or engine shop visits and this results in an increased value/improved condition. Additionally, the redelivery process will impose supplementary constraints and requirements, which will drive a commercial, rather than a purely MPD driven, condition.

Aircraft Condition and Value versus Redelivery Condition



Continues

Redeliveries – A summary of our whitepaper, with a closer look at engines

Engines

Probably the most expensive and difficult to manage aspect of redelivery is the engine life. Firstly proving life remaining for an on-condition part can provoke disagreement given its predictive nature. Many leases are written on the basis of no more time since refurbishment than X000 hours or cycles, since that cannot be argued, but clearly lessors like to be able to offer the next lessee some certainty of what can be expected. In many cases we find that engines are sent to the shop much earlier than they would otherwise be sent simply in order to provide more life at redelivery, therefore wasting the full life potential of the engine. This is typically a costly exercise: an average spend of c.\$350,000 on a single aisle, twin engine aircraft.

Another \$250,000 average spend should be budgeted for findings as a result of borescope inspections. Often, leases can stipulate inspections and power runs before redelivery. In normal service engines may continue to be airworthy despite being on watch, or having reduced borescope intervals, so this need for engines to be more than serviceable and airworthy drives early shop visits and costs.

The PMA debate drags on

It is rare for an operating lease to permit PMA (Parts manufacturer Approval) components on a leased aircraft. There is a divergence of opinion with lessees or airlines on one side of the debate, and OEMs, lessors and financiers on the other. Whilst airframe and systems PMA is becoming less of an issue for lessors, the engine gas path PMA issue remains an industry hot potato.

Clearly they offer cost benefits and, on occasion, possibly performance and reliability improvements.

However, the engine OEM will argue the component is technically inferior since it has not been tested within the overall context of mating parts and systems functionality. The engine aftermarket remains a particular issue for those seeking optimum resale value. As a result the relative value of the engine is lower – a situation with obvious negative ramifications for both lessors and financiers. Of course for those airlines who have not leased aircraft or engines, the consideration of resale value may be irrelevant if they use the aircraft or engine for its full economic life.

OEM long term schemes

These are risk transfer schemes for a specific period and not maintenance reserves for future maintenance once the initial operator's lease has concluded.

The approach is based on the initial operator and OEM being focused on longest possible on-wing life, this can lead to misalignment of the agreed lease redelivery conditions.

As a result, the difference between the OEM fixed term based agreement (that expires at initial lease end) and the lessor's desire to have funds accrued for future maintenance, has led to large variations in what was the expected future lease end value versus what the real market value is.

There is no doubt that these schemes are attractive to the initial operator since the risk is transferred, at a price, but the secondary market suffers with significant buy-in costs to enrol engines into the scheme.

So, work to have the contracts with OEM, lessor and financier aligned. Or hire someone to advise and support.

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International Bureau of Aviation

Minimising Risk - Maximising Opportunity

About IBA

IBA is an independent aviation consulting firm founded in 1988 to advise owners, financiers, operators, leasing companies, agencies and governments on commercial and business aviation matters around the globe. Headquartered in the UK, the IBA Group has grown to become one of the leading aviation consultancies in the world, assisting the international aerospace community on a daily basis.

IBA's aviation experience has been gained over almost 30 years of trading and ranges from asset inspections and valuations, repossession, operator assessments, aircraft and engine management programmes, lease assistance, workout programmes, aviation asset appraisals, remarketing and sourcing projects, consulting and commercial services, technical and engine management, services for corporate aircraft and owners, industry and sector research and analysis, training and regulatory services.

IBA's maintenance advisory team provide analysis, maintenance forecasting and maintenance cost benchmarking, as well as detailed studies on airframe, engine and parts costs supported by market intelligence.

IBA is a member of ISTAT and employs Certified Appraisers, who are fully qualified and experienced to provide a wide range of valuation reports and studies. IBA is also a UK CAA/EASA approved organisation and can assist with regulatory matters such as compliance and transfer of aircraft to and from other registries. With a wide range of in-house expertise, IBA can inspect all types of fixed and rotary wing aircraft at various stages in the asset cycle, from pre-purchase inspection, mid-lease review, to pre-return inspection, or as part of the bank/lessor due diligence process.

Furthermore, IBA can provide turnkey advisory services, including aircraft and route selection, evaluation, contractual support, source and inspection, delivery management services and in-service management.

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