



Airline Maintenance Cost Executive Commentary

An exclusive benchmark analysis (FY2009 data) by IATA's Maintenance Cost Task Force

Executive Summary

In 2009, global aviation faced the worst decline to date. Economies worldwide have been shaken by the global crisis and demand for aviation plunged. The air cargo industry has been extremely hard hit, as demand for air freight is very elastic and demand for consumer goods dropped to record lows. The financial consequences for the aviation industry have resulted in a "permanent" loss of 2.5 years of growth in passenger business and 3.5 years of growth in air cargo*.

The 40 MCTF participating airlines in 2009 reported a total fleet of 3,312 aircraft. Boeing aircraft represented the majority (63%), followed by Airbus with 32%. Narrow body aircraft represented over 60% of the fleet, while wide body aircraft accounted for 32% of the fleet.

The direct maintenance cost per flight hour varied for the 40 MCTF airlines according to the aircraft category, from an average of \$682 per flight hour for narrow bodies to \$1,430 per flight hour for wide body aircraft equipped with three or more engines and \$1,204 per flight hour for wide body aircraft equipped with 2 engines. Regional jets posted the lowest maintenance cost - \$461 per flight hour.

As far as the 20 consistent MCTF airlines are concerned, the total direct maintenance spending decreased for the first time in the past four years by 6%. Most likely, this is attributed to airlines deferring maintenance and retiring older aircraft. Meantime, the fleet renewal rate was of 8%, as older aircraft orders had to be delivered.

Overhead accounted for an average of 24% of the total maintenance cost. As not all airlines reported the overhead cost, for the purpose of this analysis we mostly focus on the direct maintenance cost (DMC).

The 20 airlines continuously reporting to the MCTF for 4+ years flew 2% less flight hours and 6% less flight cycles, resulting in a 3% lower annual aircraft utilization (down to 8.82 hours/day). The stage length increased by 4% compared to the year before.

Engine cost remained by far the largest single expenditure, amounting to about 43% of the maintenance spending. Almost three quarters of engine maintenance was outsourced; this excludes materials purchased for the airlines which do work in house.

Covering all maintenance costs except for employee cost (which is part of the in-house maintenance), the supply chain area represented the vast majority of maintenance spending. The reliance on supply chain remained relatively constant year on year, hovering around 80% of the direct maintenance spending. Including material, it even amounted to over 90% in case of engine maintenance. Unit costs (\$ per flight hour) for the 20 MCTF airlines decreased, except for outside repair which increased slightly from \$564 in 2008 to \$572 in 2009.

*Source: IATA (Jan 2010)

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DEFINITIONS & ACRONYMS

20 MCTF airlines: Airlines which provided data consistently over the past four years (FY2006-2009)

40 MCTF airlines: Airlines which provided data for FY2009

*
* *

AC: Aircraft

Aircraft family: Aircraft communalities (e.g. A320 Family includes A318, A319, A320, A321)

Cost elements: Material, labor and outside repairs (or outsourced, used interchangeably)

Cost segments: Line, base, component and engine maintenance

DMC: Direct Maintenance Cost

FC: Flight Cycle

FH: Flight Hour

MCTF: Maintenance Cost Task Force

NB: Narrow-body aircraft with more than 100 seats (excludes Embraer 190/195)

RJ: Regional-jets up to 100 seats (includes Embraer 190/195)

Supply Chain: includes all maintenance activities performed by third party (outsourcing) and the cost of material purchased to do work in-house

Total Maintenance Cost: DMC plus overhead

TP: Turbo-props

WB: Wide-body aircraft with more than one aisle or equivalent freighter

WB2: Wide body aircraft equipped with two engines

WB3+: Wide body aircraft equipped with 3 or more engines

1. GLOBAL PICTURE

1.1. World Fleet

Of the 4,157 new jet aircraft added to the world fleet between 2002 and 2009, just about half were narrow body, while wide body accounted for 14%. A noteworthy evolution was that of regional jets, with the world fleet adding 1,560 regional jet aircraft, accounting for 38% of the total global growth (Figure 1).

The trend for the past 8 years reflects the growth of aviation notably in Asia and in the Middle East, but also in Europe and South America as the result of the market opening (deregulation). As airlines in these regions added new aircraft to their fleets, the average fleet age decreased. In Europe and the Middle East, the demand for regional jets was driven up by a rapid growth of Low Cost Carriers (LCCs) and Regional Carriers. North American fleet marginally expanded by a net of 191 aircraft. This is due to the fact that almost 700 older narrow body aircraft have been retired and replaced with smaller capacity regional jets. The youngest average fleet age remains that of the Pacific Rim (9.9 years), with the African region at the opposite pole (21.1 years).

A total of 524 McDonnell-Douglas have been retired between 2002 and 2009, 60% of which having been removed between 2008 and 2009. This trend indicates an accelerated move by airlines to retire older fleets, especially at tough economic times.

In 2009, Airbus and Embraer increased their market share at a steady rate of 7% and 9% respectively. While the increase is significant, it is still well below the double-digit growth seen for these two manufacturers in the years preceding the economic recession.

World fleet utilization decreased slightly to 7.91 hours per day, from 7.98 hours per day in 2008. MCTF airlines were however capable of improving utilization and reported an average of 8.8 hours in 2009 (Figure 2).

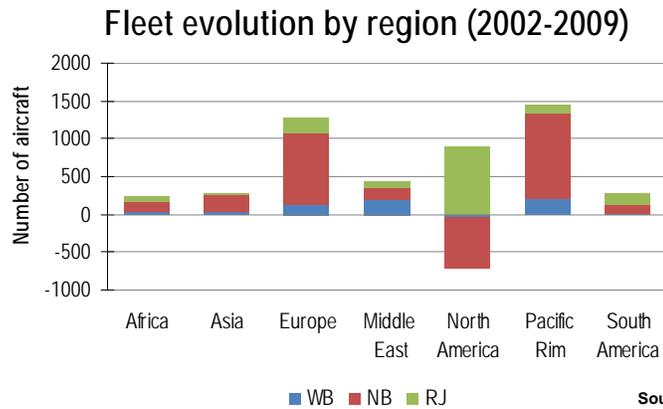
At the same time, airlines worldwide have constantly increased the stage length from 1.87 to 2.04 hours between 2002 and 2009.

2. Maintenance, Repair and Overhaul (MRO) Market

Worldwide MRO spending estimates for 2009 continued the upwards trend netting a 0.6 billion increase year on year to 45.7 billion dollars (Figure 3). The very small increase reflects the hardship year for airlines which may have deferred maintenance and expedited the replacement of older fleets in an effort to keep maintenance expenses to the minimum.

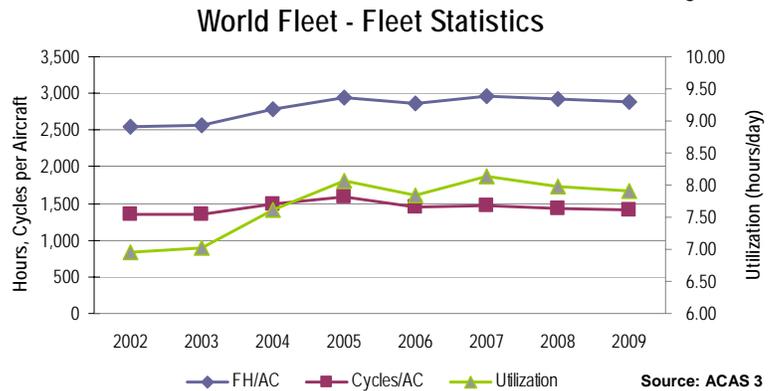
We would like to point out that certain elements are not included in the above-mentioned forecast – such as overhead, inventory/logistics-associated costs and depreciation.

Figure 1



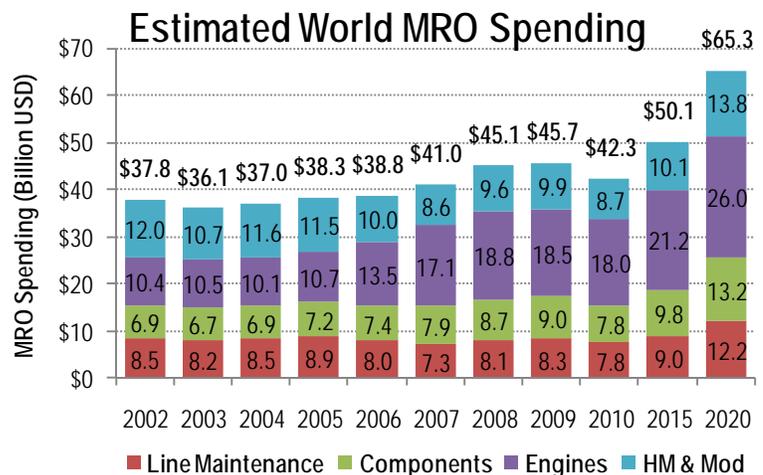
Source: ACAS 3

Figure 2



Source: ACAS 3

Figure 3



Source: Aviation Week / Overhaul & Maintenance, April 2010 Issue

2. Cost Analysis (FY2009) - 40 MCTF Airlines

Fleet Count by Manufacturer - 40 MCTF Airlines in 2009

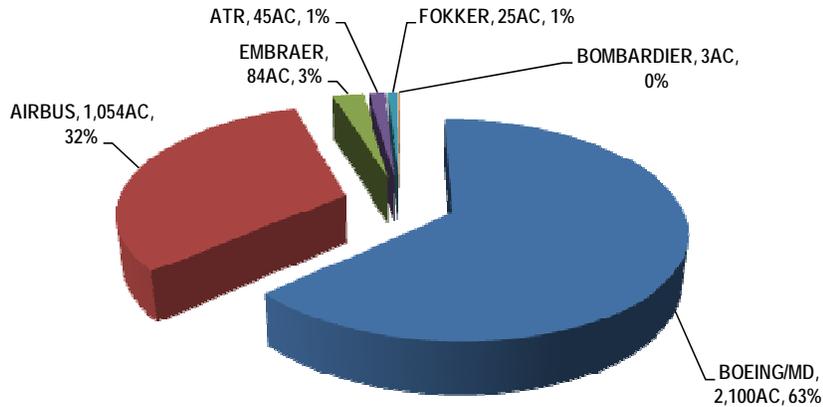


Figure 4

Source: MCTF 2010

In fiscal year 2009, 40 airlines participated to the Maintenance Cost Task Force (MCTF). The current section presents a relevant analysis of the data provided by these airlines. For details on MCTF see page 15.

Total fleet count for all the 40 airlines that participated this year to MCTF was 3,312 aircraft. Total flight hours and total flight cycles were 10.4 million and 4.5 million respectively. Average age of the fleet was 10.7 years. Fleet distribution of the participating airlines (Figure 4) shows 63% Boeing/MD and 32% Airbus while other manufacturers have low market share (3% or less).

For wide body aircraft, cost per flight hour varied from \$811 for the A330 fleet to \$2,212 for the MD-11 fleet (excluding from this the A380, as it had just started flying). The MD-11 also tops the cost of older planes in terms of dollars per aircraft – \$8.2 million (Figure 5).

Regarding narrow body aircraft, Figure 6 shows that airlines spent in average \$2 million per aircraft or \$600 per flight hour for both Airbus 320s and Boeing 737NGs. MCTF airlines indicated the MD-80 fleet as top maintenance cost performer in 2009, and the MD-90 as the fleet most expensive to maintain. The relatively low operational cost of the MD-80 fleet is attributed to its retirement. Most likely, the aircraft that is retired is just before a major heavy airframe check and both engines and other major components are at the end of their economic life. It is expected that in the upcoming years this trend will continue.

Wide Body Unit Cost - 40 MCTF Airlines in 2009

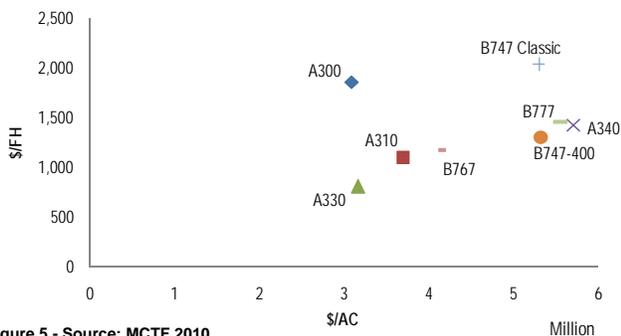


Figure 5 - Source: MCTF 2010

Narrow Body Unit Cost - 40 MCTF Airlines in 2009

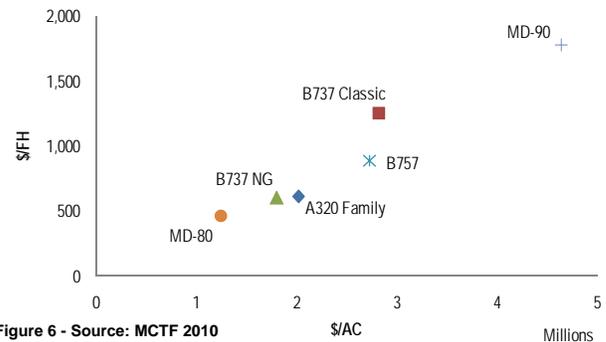


Figure 6 - Source: MCTF 2010

2.1. Direct Maintenance Cost by Segment

In 2009, the proportion of engine maintenance to direct maintenance cost was 43% for the 40 MCTF-participating airlines. Base and component maintenance accounted for the same share of the cost each, respectively 20% (Figure 7).

Line maintenance accounted for 17% of the DMC. As line maintenance is directly linked to the daily operations, it is not surprising that airlines keep tight control and outsource only about a fifth of it, most likely related to the work done at outstations. As expected, wide body aircraft reported the highest average with \$210/FH (Figure 8).

Maintenance Spend by Market Segments - 40 MCTF Airlines in 2009

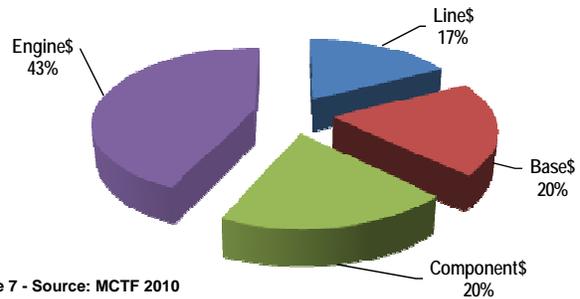


Figure 7 - Source: MCTF 2010

Line Maintenance by Cost Element - 40 MCTF airlines in 2009

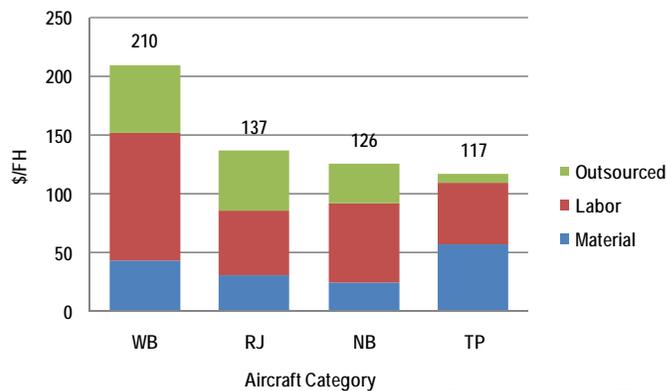


Figure 8 - Source: MCTF 2010

2.2. Direct Maintenance Cost by Element

Average labor rate varied significantly, as the 40 MCTF participating airlines reported in 2009, with a median cost of in-house labor of 38 dollars/man-hour. This is a direct reflection of the various socio-economical contexts the airlines are operating in, with the specifics of the geographical region where they are located. Significant differences occur between rates in the developed vs. developing world. Despite our MCTF efforts, understanding of the calculation of the labor rate is not always consistent.

With labor cost accounting for 21% of the direct maintenance cost, labor rate plays a significant role in the financial equation of airlines. Together with material, in-house maintenance amounted for 42% of the maintenance spending in 2009 (Figure 9).

Maintenance Spend by Cost Elements - 40 MCTF Airlines in 2009

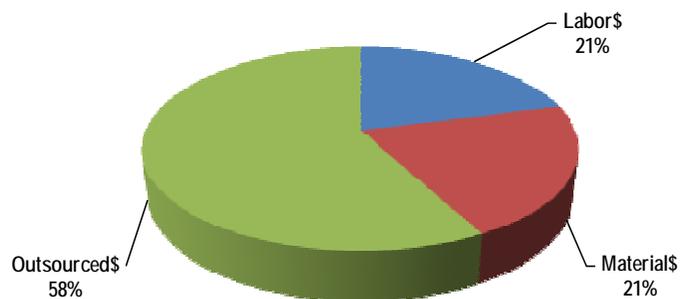


Figure 9 - Source: MCTF 2010

Outside repairs may offer an alternative to mitigating potentially high in-house labor costs - and for the 40 MCTF airlines, 58% of the maintenance was in fact performed by third parties last year. As outsourcing is the largest portion of the direct maintenance cost, airlines need to focus on elements related to outsourcing contracts such as workscope definitions, financial terms, extent of the services offered and supplier management.

3. Cost Analysis (FY2006-2009) - 20 MCTF Airlines

Out of the 40 MCTF-participating airlines this year, we will focus in this section on the trend analysis of data furnished by the consistent participants. These are 20 world airlines which provided data over the past four fiscal years (2006-2009). We will refer to them as the "20 MCTF airlines".

3.1. General Trends

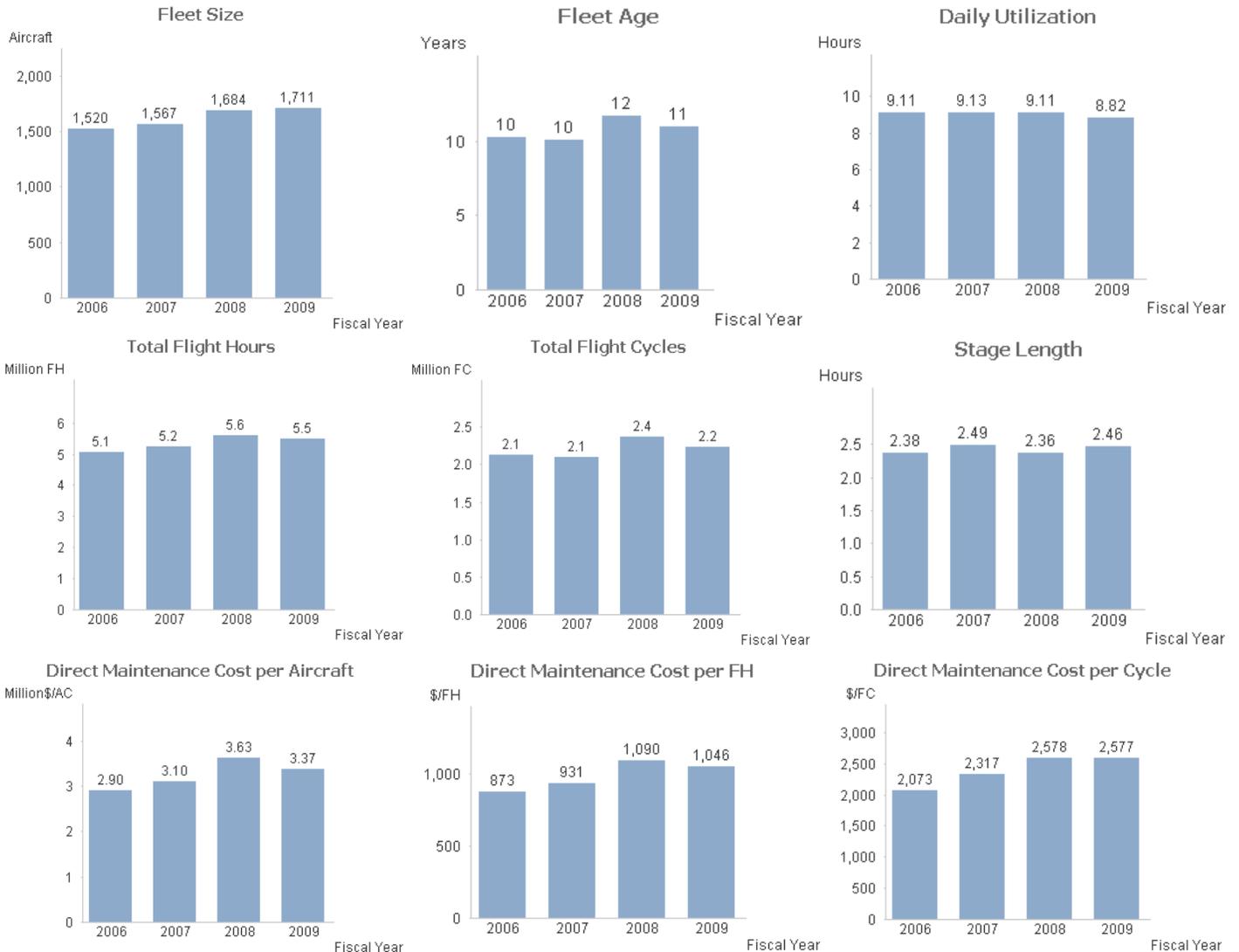


Figure 10 - Source: MCTF 2010

FOR MORE INFORMATION ON MCTF

Contact us: mctf@iata.org

Visit our website: www.iata.org/mctf



For the 20 consistent participants, fleet count increased to 1,711 aircraft between 2006-9, with airlines introducing 98 aircraft and retiring 72 aircraft.

Compared to 2008, the number of flight hours in 2009 decreased by 3% and number of flight cycles by 6%. The utilization went down to 8.8 hours/day. Nevertheless, the utilization of both narrow body and wide body aircraft remains significantly higher than the world average of 7.91 hours/day. The stage length increased from 2.36 to 2.46 hours.

The average age of the fleet for the 20 consistent MCTF participants improved slightly in 2009, due to the addition of the new aircraft, combined with the retirement of older planes (Figure 12). Airlines expanded their fleet by adding 62 narrow body and 36 wide body aircraft. The demand for RJs and turboprops by the 20 consistent airlines seems small and constant.

Utilization of wide body aircraft went down 6% from 10.7 hours/day in 2008 to 10.1 hours/day in 2009, while the utilization of narrow body, regional jets and turboprop aircraft remained at similar levels, hovering around 7.8 hours/day.

The fleet mix reveals that narrow body aircraft account for 52% of the fleet with wide body aircraft representing 44% of the fleet of the 20 consistent participants (Figure 11). The very low number of turboprop and regional jets reflects the business model of these 20 airlines, as they are focusing on mainline operations and allowing regional subsidiaries to operate other routes (Figure 13).

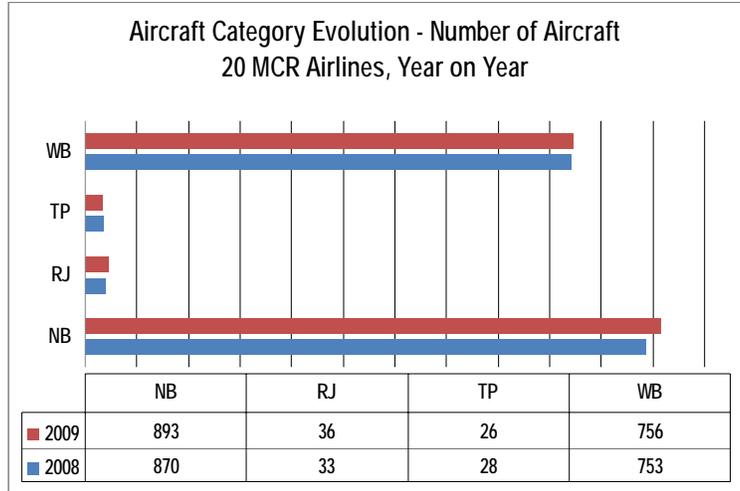


Figure 11 - Source: MCTF 2010

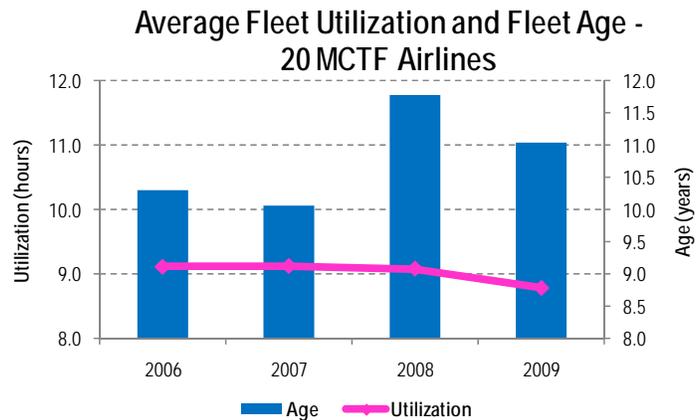


Figure 12 - Source: MCTF 2010

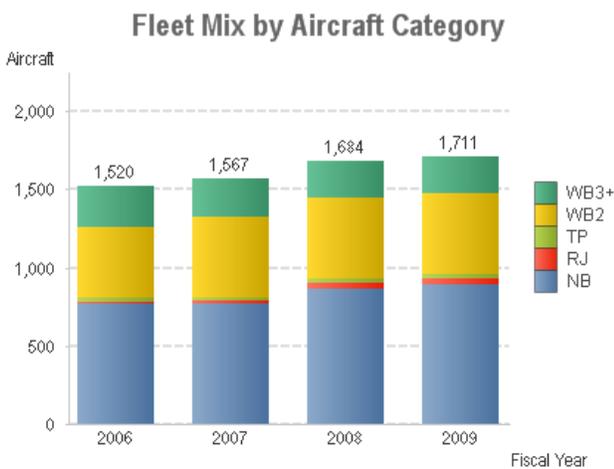


Figure 13

Source: MCTF 2010

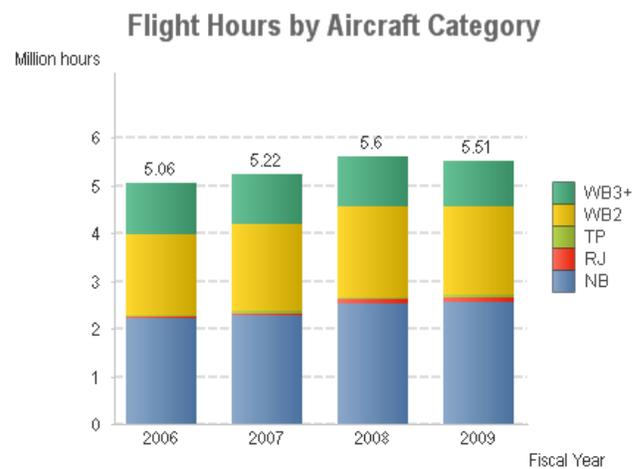


Figure 14

3.2. Maintenance Costs Overview

The direct maintenance cost per aircraft decreased by 7%, from 3.63 million dollars in 2008 to 3.37 million dollars in 2009. At the same time, the cost per flight hour decreased by 4%, while the cost per flight cycle remained rather constant. Engine maintenance accounted for about 40% of direct maintenance costs (Figure 15).

For the 20 airlines constantly participating to MCTF, the direct maintenance spending was 6% lower in 2009 compared to the year before. Component maintenance spend remained virtually unchanged over the same period. The market segment for which airlines cut down the most was base maintenance (9%). The cost of base maintenance per flight hour decreased from an average of \$213 in 2008 to \$198 in 2009, as a result of the retiring of older aircraft therefore the elimination of the need for the heavy checks associated with the respective planes (Figure 16).

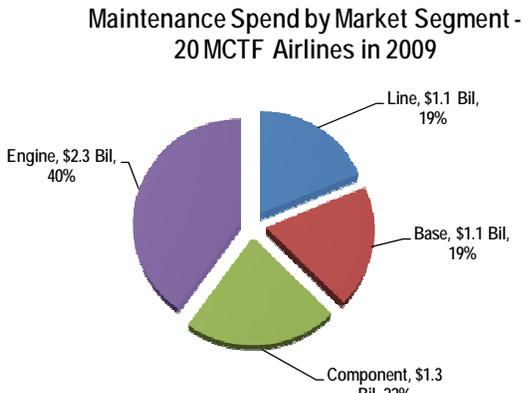


Figure 15 - Source: MCTF 2010

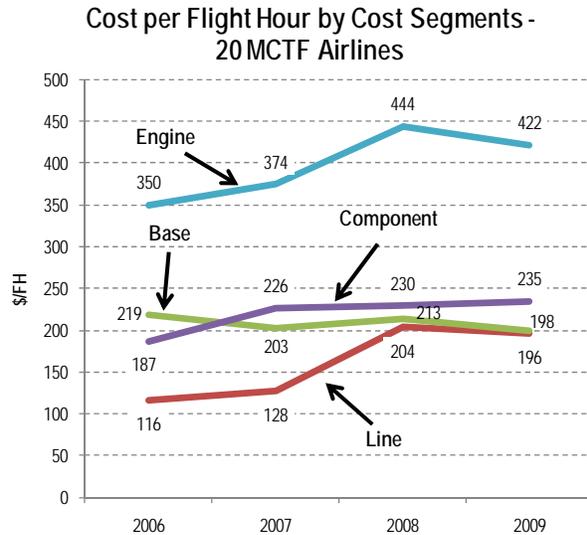


Figure 16 - Source: MCTF 2010

Engine spend decreased by 7% year on year, while engine cost per flight hour went down 5%, from \$444 in 2008 to \$422 in 2009 (Figure 16).

As the outsourced maintenance remained at similar levels with the previous year and such long-term contracts cannot be renegotiated at short notice, most of this variation in the engine cost in 2009 may be explained by the reduced scope of maintenance, hence the need for less material.

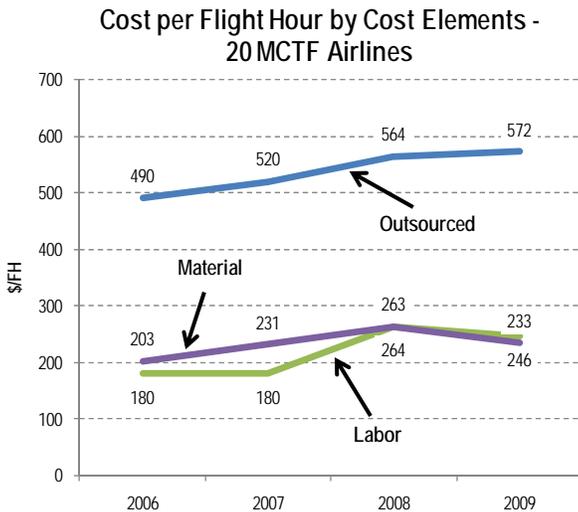


Figure 17 - Source: MCTF 2010

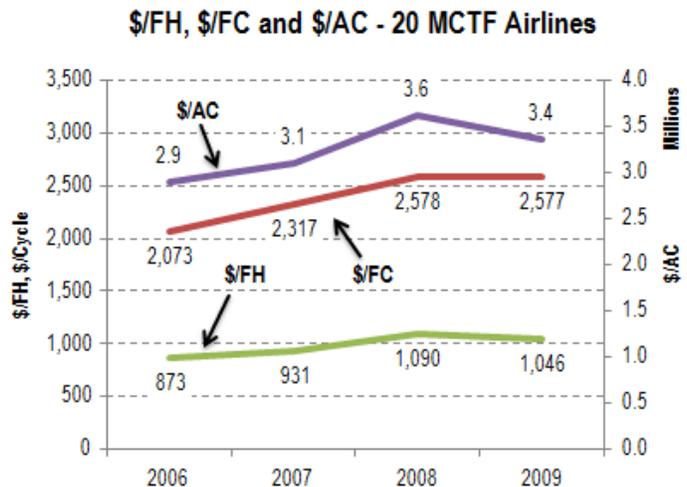


Figure 18 - Source: MCTF 2010

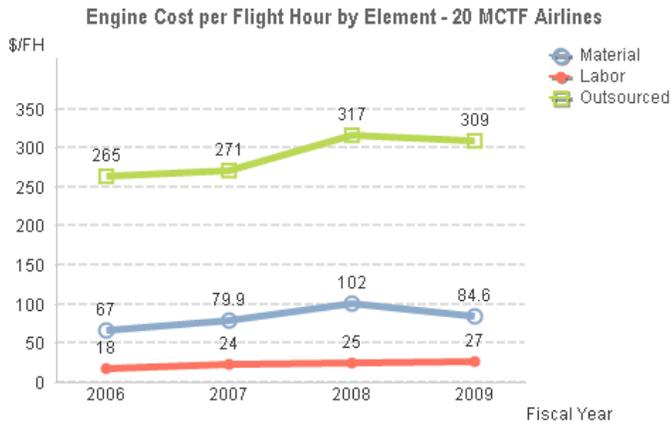


Figure 19 - Source: MCTF 2010

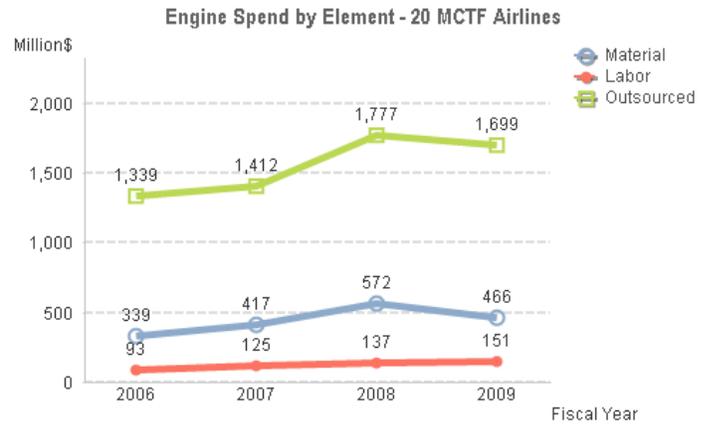


Figure 20 - Source: MCTF 2010

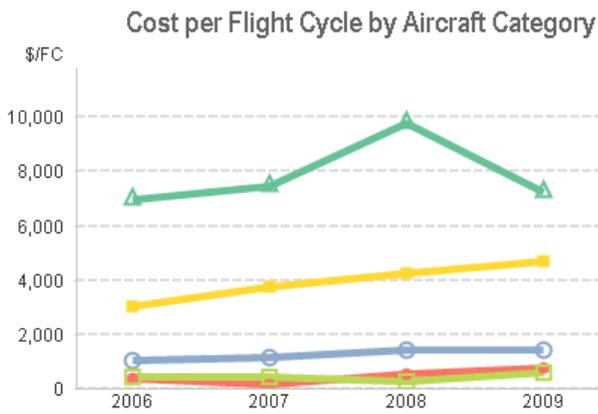


Figure 21 - Source: MCTF 2010

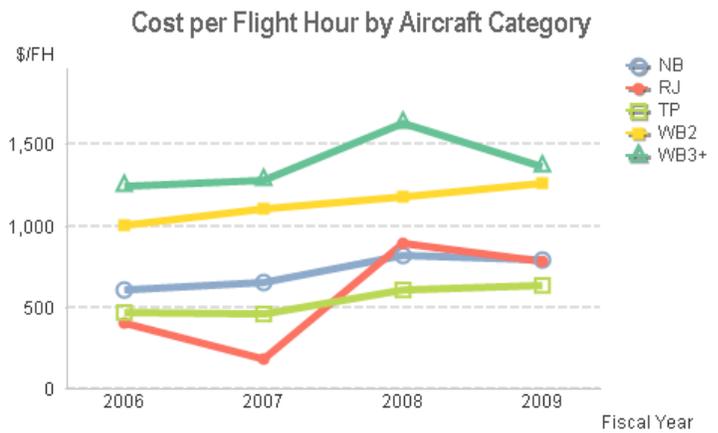


Figure 22 - Source: MCTF 2010

Line maintenance accounted for 19% of the direct maintenance spend by the 20-MCTF airlines (Figure 15). This represented a 6 percentage point increase from the amount spent by the same 20-MCTF airlines in 2006. At the same time, the spending is consistent with the 17% spent by all 40 participating airlines.

Labor remains the largest portion of the line maintenance cost, accounting for about 60% of the expenses associated with this cost element, the remaining being spent in purchasing material (15%) or at servicing the aircraft by contract line maintenance (Figure 23).

Line Maintenance Spend by Element - 20 MCTF Airlines

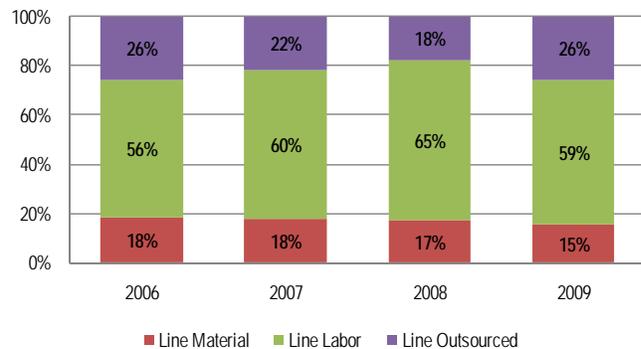


Figure 23 - Source: MCTF 2010

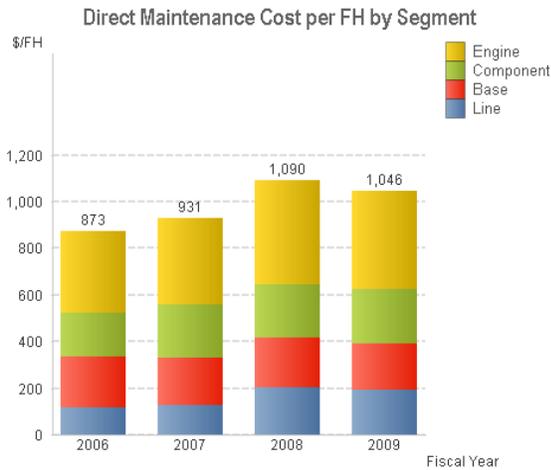


Figure 24 - Source: MCTF 2010

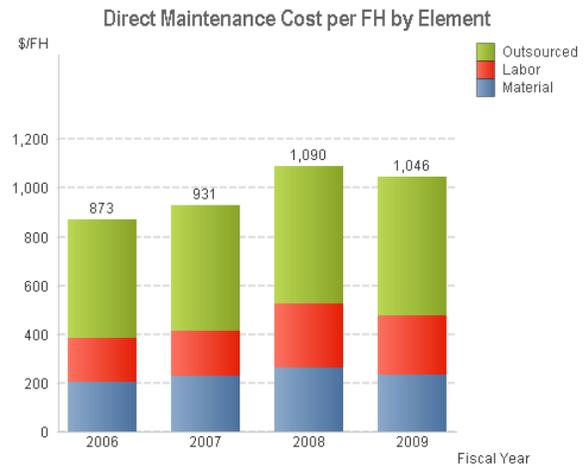


Figure 25 - Source: MCTF 2010

3.3. Supply Chain

By supply chain we refer here to the maintenance services which are purchased (outsourced) plus the material purchased, thus the total of maintenance which airlines have no hands-on control over and for which they need to rely on third-party services. In general, there is no tendency by the 20 consistent participants to rely more on supply chain as it is commonly assumed. While the cost of outside repairs increased, percentage-wise the 20 MCTF airlines purchased slightly less in 2009 compared to 2006 (Figure 26).

Supply Chain Perspective - 20 MCTF Airlines

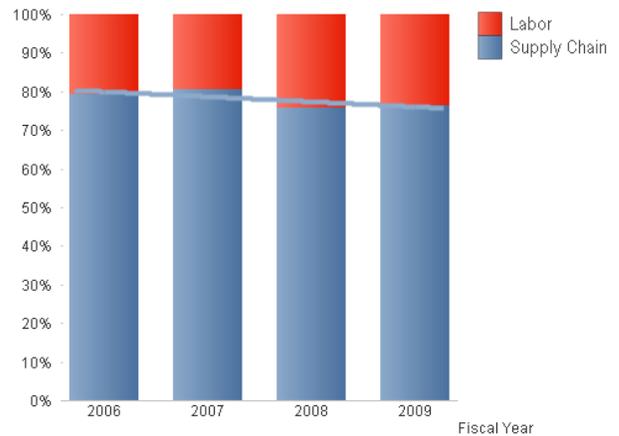


Figure 26 - Source: MCTF 2010

Supply Chain Perspective - 20 MCTF Airlines

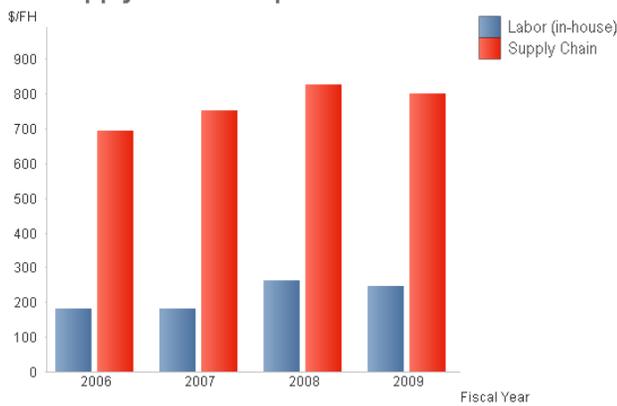


Figure 27 - Source: MCTF 2010

Supply Chain Perspective - 20 MCTF Airlines

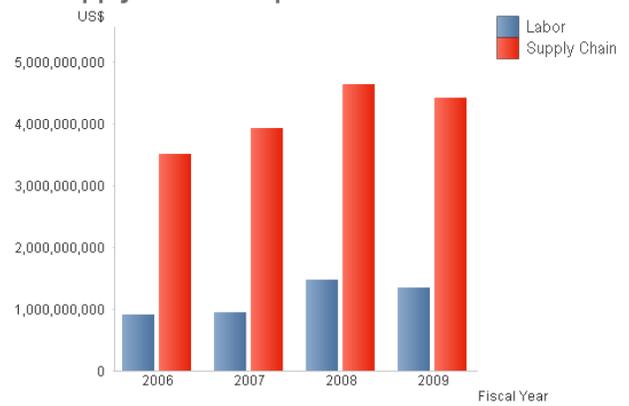


Figure 28 - Source: MCTF 2010

The highest direct maintenance cost reported by the 20 consistent airlines over the past four years was recorded in 2008. In 2009, as utilization decreased and recession started showing its effects, airlines decreased their maintenance spend and deferred maintenance. Additionally, the introduction of new aircraft brought the maintenance honeymoon amongst other benefits, with the reduction of maintenance costs for older planes as a direct consequence. This also explains why the cost per aircraft decreased from 3.6 million in 2008 to 3.4 million in 2009. Conversely, the cost per flight hour and the cost per cycle increased only marginally year on year, as airlines recorded slightly less hours and cycles (Figure 10).

Overall, for the 20 consistent airlines, the average unit cost (per aircraft, per flight hour and per cycle) decreased marginally in 2009 compared to 2008.

This may be explained by the evolution of several factors:

- Total direct maintenance spending: 6% decrease from 6.1Bn to 5.8Bn;
- Line spending: 7% decrease from \$1.12Bn to \$1.06Bn;
- Base spending: 9% decrease from \$1.2Bn to \$1.1Bn;
- Engine spending: 7% decrease from \$2.47Bn to \$2.3Bn ;
- Fleet renewal: 8% decrease of the fleet age from 12 years in 2008 to 11 years in 2009;
- Flight cycles: 6% less departures;
- Flight hours: 2% less hours flown;
- Utilization: 2% decrease from 9.11 to 8.82 hours year on year.

4. Maintenance Cost Analysis by Aircraft Category

4.1. MCTF Narrow Body Aircraft

The 20 consistent participants continued to expand their narrow body fleet, keeping the upward trend confirmed year-on-year, and finished 2009 with a record 893 aircraft. Currently, narrow body aircraft account for 55% of their fleet. Boeing is the market leader with a total of 635 aircraft, followed by Airbus with 258 aircraft. However, while keeping the leader position, Boeing has steadily lost ground to Airbus in the narrow body segment, the latter increasing its market share by 7 percentage points, from 22% in 2006 to 29% in 2009 (Figure 29).

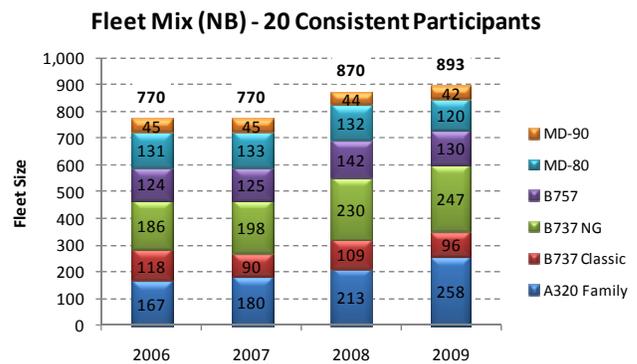


Figure 29 - Source: MCTF 2010

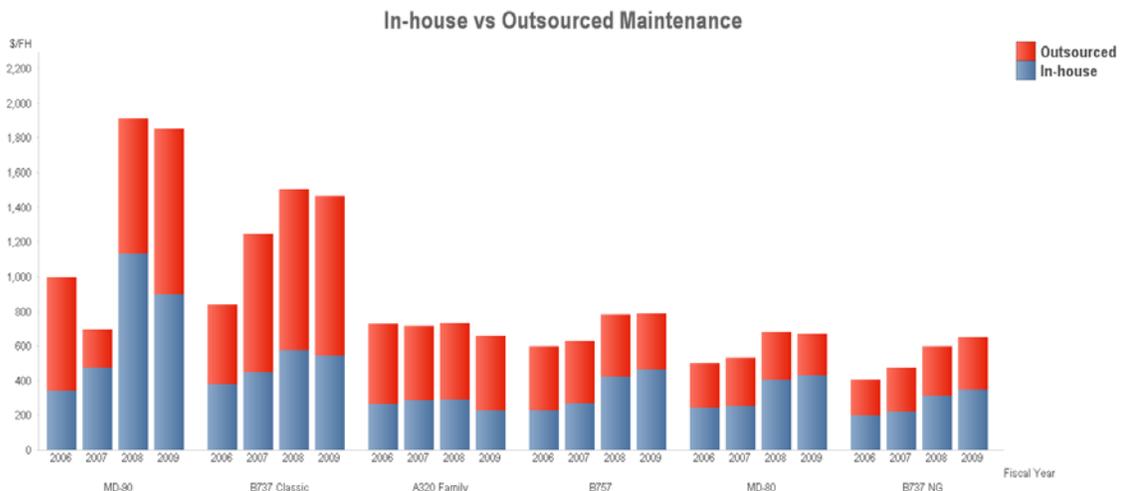


Figure 30 - Source: MCTF 2010

Maintenance cost trend analysis indicates that airlines spent less on base and engine maintenance in 2009. Together with the decrease in the number of flight hours, this resulted in a decrease of the maintenance cost per flight hour for these two market segments. At the same time, component and line maintenance cost per flight hour increased only marginally compared to 2008. (Figure 33-34)

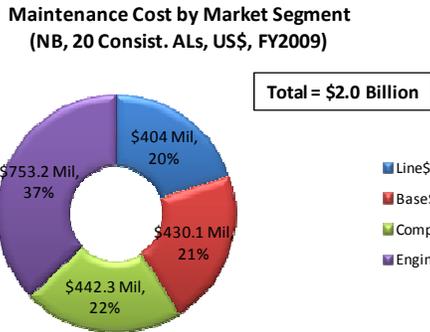


Figure 31 - Source: MCTF 2010

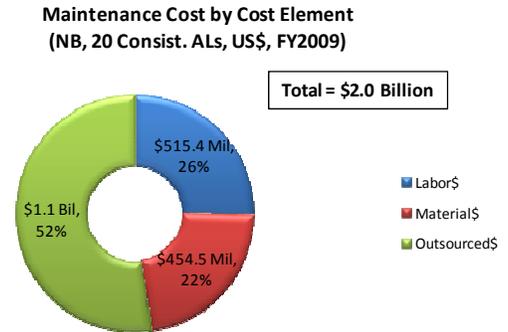


Figure 32 - Source: MCTF 2010

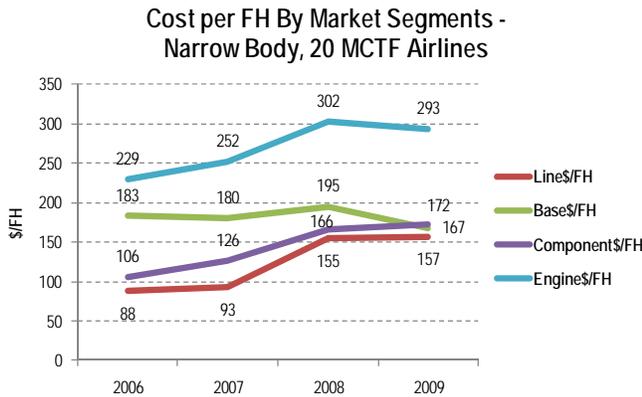


Figure 33 - Source: MCTF 2010

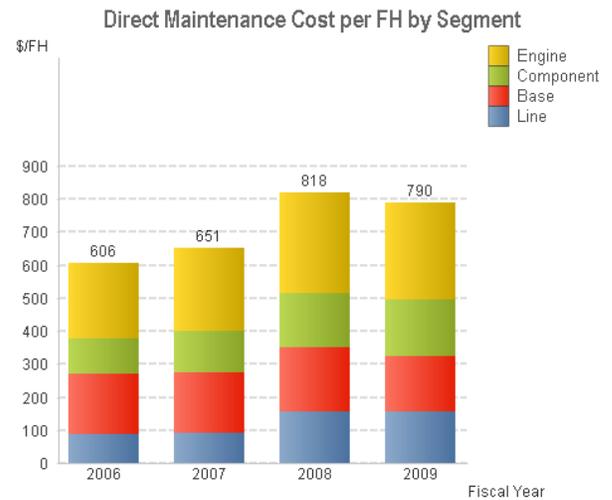


Figure 34 - Source: MCTF 2010

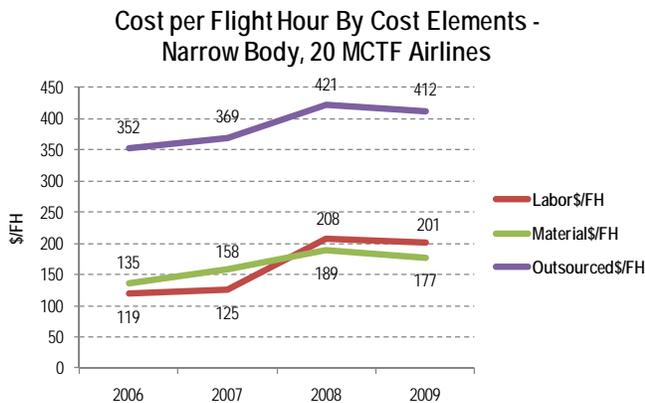


Figure 35 - Source: MCTF 2010

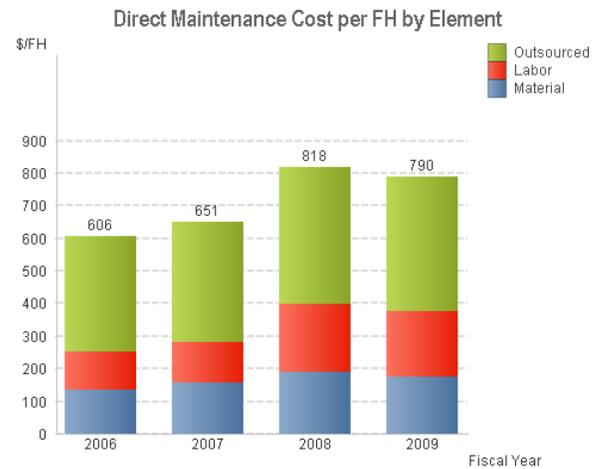


Figure 36 - Source: MCTF 2010

4.2. MCTF Wide Body Aircraft

The number of older aircraft (A300, MD-11, A330-200) declined as airlines added newer aircraft of the same family to their fleet. As mentioned above, the 20 consistent MCTF airlines chose to increase the narrow body fleet. Especially for older aircraft, maintenance is mostly outsourced, with only a small percentage of works performed in-house.

The evolution of the maintenance cost for the A310 fleet indicates that airlines are retiring this fleet (Figure 38). The number of aircraft decreased constantly between 2006 and 2009, with the number of flight hours and flight cycles following the same pattern. Over the same period, the cost per flight hour and the cost per flight cycle decreased by 40% and 39% respectively.

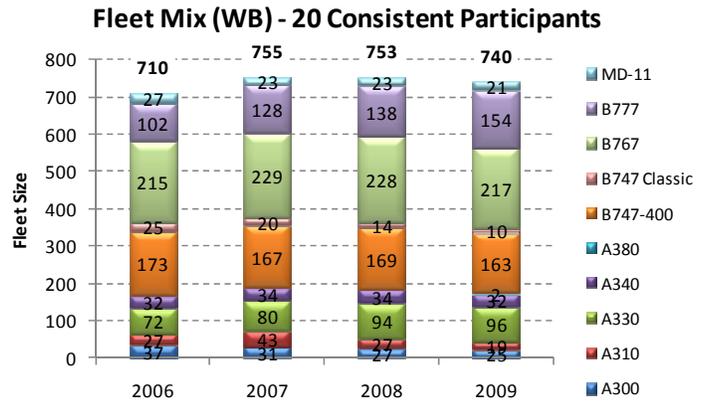


Figure 37 - Source: MCTF 2010

In-house vs Outsourced Maintenance

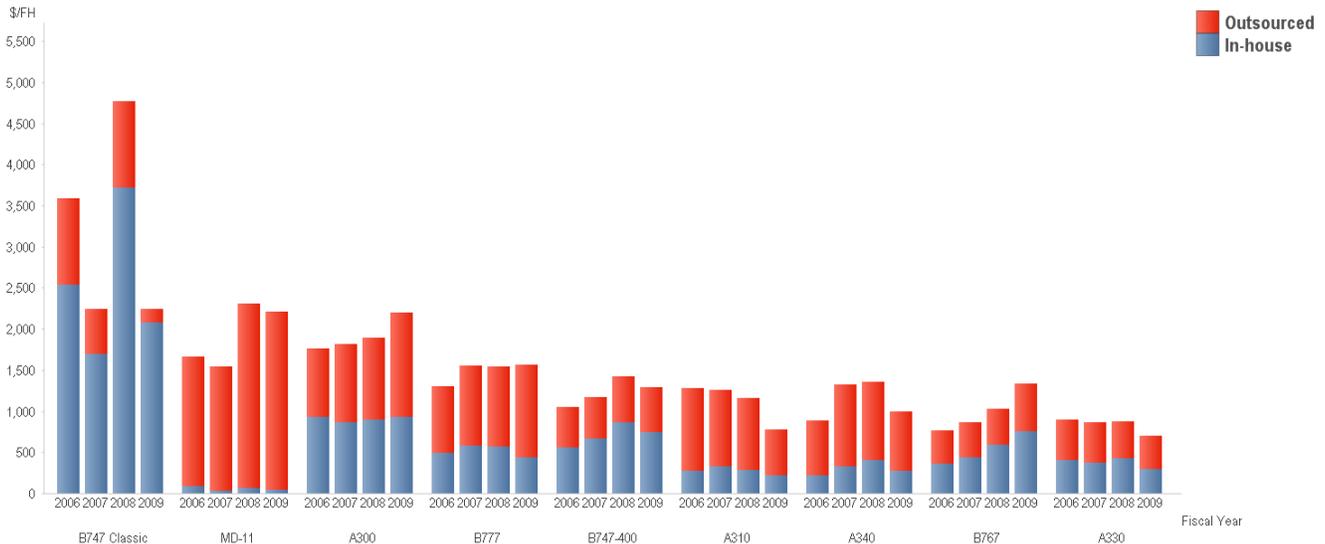


Figure 38 - Source: MCTF 2010

Maintenance Cost by Market Segment (WB, 20 Consist. ALs, US\$, FY2009)

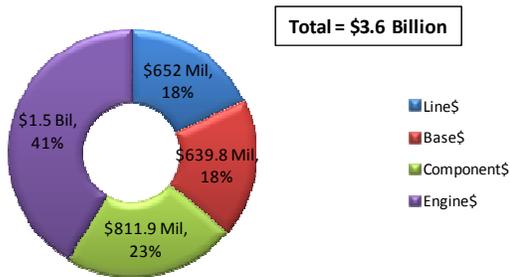


Figure 39 - Source: MCTF 2010

Maintenance Cost by Cost Element (WB, 20 Consist. ALs, US\$, FY2009)

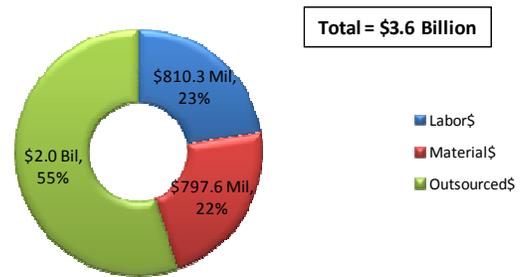


Figure 40 - Source: MCTF 2010

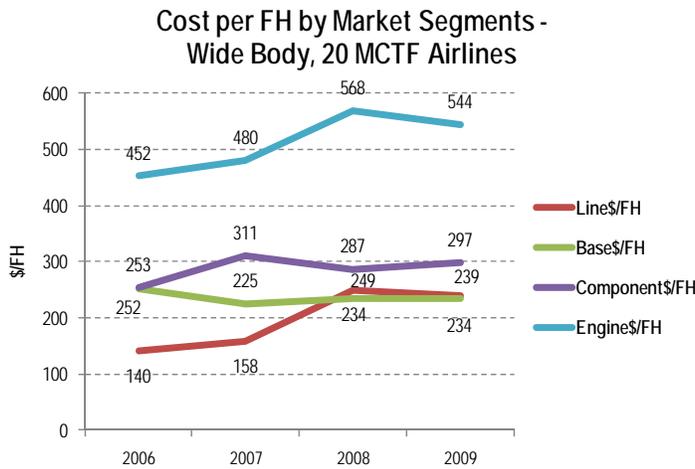


Figure 41 - Source: MCTF 2010

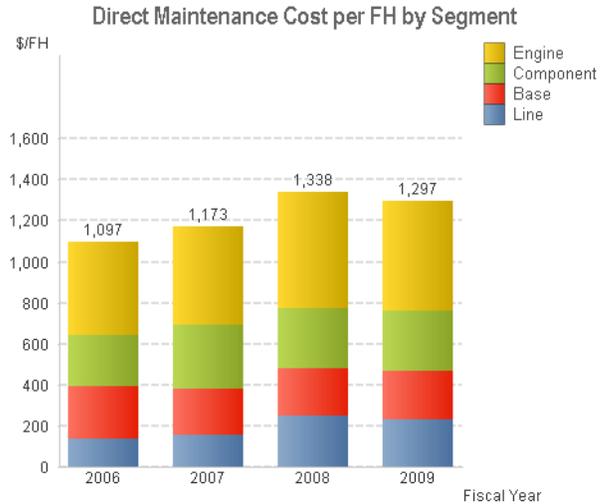


Figure 42 - Source: MCTF 2010

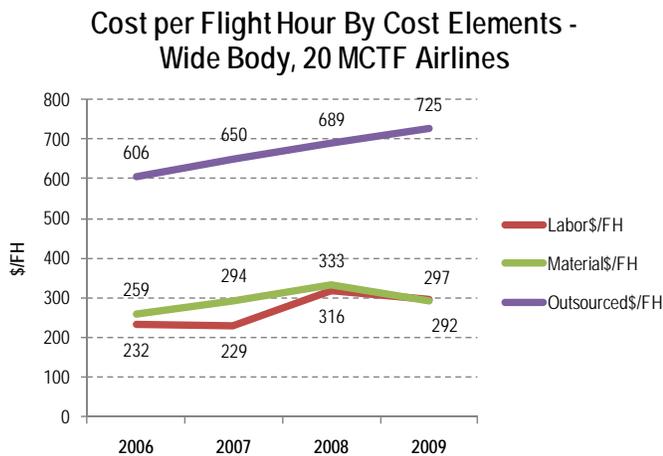


Figure 43 - Source: MCTF 2010

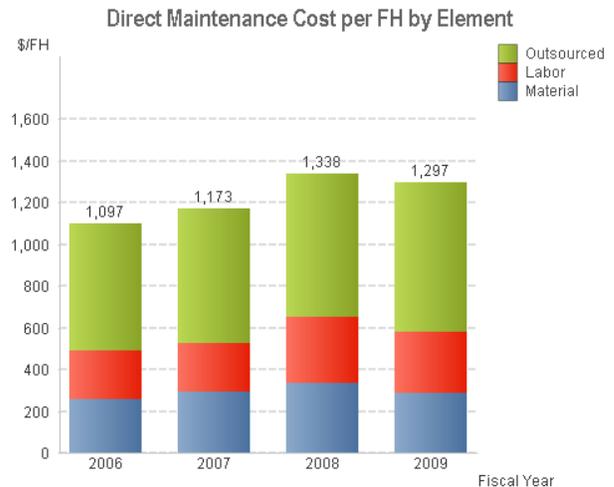


Figure 44 - Source: MCTF 2010

5. Conclusion

By renewing the fleet and deferring maintenance, airlines have tried to mitigate the downside effect generated by the world economic crisis. While airlines were cutting on capacity, they were also taking this opportunity to increase their fares, to help recover quicker from the global financial crash.

The 40 MCTF participating airlines posted a mixed cost picture, with an average labor rate of 42 dollars (not including overhead). The total spending by these airlines was in excess of 12 billion dollars, which represents about 30% of the estimated world MRO in 2009. Overhead spending amounted to about 3 billion dollars, while the direct maintenance spending (line, base, component and engine) represented 76% of the total maintenance cost. Their average direct maintenance cost per flight hour was 893 dollars, and the average direct maintenance cost per cycle was 2,091 dollars.

The 20 consistent MCTF airlines reported less cycles (-6%) and less flight hours flown (-2%) as well as a lower average fleet utilization (down 2%, from 9.11 hours/day in 2008 to 8.82 hours/day in 2009), while increasing the stage length by 4% to 2.46 hours.

For the 20 MCTF airlines, the fleet count increased as these airlines added 98 aircraft (mostly narrow body and regional jets) while retiring 72 older aircraft. The total direct maintenance spending decreased from 6.1Bn to 5.8Bn. Except for component spending, airlines lowered their spending for all other cost segments. Thus, line maintenance spend decreased by 7%, base by 9% and engine by 7%.

Airlines seem to have focused in 2009 on retiring older fleets, reducing workscope or deferring maintenance, and on increasing time on wing for engines. Whether they succeeded in finding a right balance to maximize their assets, or simply pushed back (and piled up) maintenance expenses and events which will translate in the coming years in red figures on the passive of their balance sheet, remains to be seen.

IATA's Maintenance Cost Task Force (MCTF)

WHY PARTICIPATE IN MCTF?

- MCTF is the industry focal point on commercial airline maintenance costs, including MRO (Maintenance, Repair and Overhaul) cost strategies.
- By joining MCTF, airlines benefit from access to unique tools which permit benchmarking against industry performance covering 48 aircraft versions / 24 aircraft families, and providing for 36 airframe/ engine combinations.
- Participation to MCTF is free of charge and open to any interested airline.



COST VS. BENEFITS

- The data required for participation to MCTF is already available at the maintenance and finance departments respectively. Once the relevant information identified, airlines are required to populate an input toolset with them.
- The input toolset is a user-friendly Excel form, designed by Airbus. The output software designed by Boeing allows for customized analysis based on the specificities of each airline. Airline fleet performance can be benchmarked based on cost per flight hour, cost per aircraft, and cost per cycle (departure).

TIMELINE FOR AIRLINE PARTICIPATION IN MCTF 2011 EDITION

DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
			Data Collection									
			<i>Your Input DEADLINE July 31st!</i>									
								Data Analysis				
										MCC 2011		
MCR 2011 (2010 data)			Maintenance Cost Conference 2011									

➤ **31st July:** Deadline for MCTF data collection

➤ **August – September:** Data analysis

➤ **October – November:**

◆ Maintenance Cost Conference (MCC)

◆ e-MCTF toolset

◆ Airline Maintenance Cost Executive Commentary (AMCEC)



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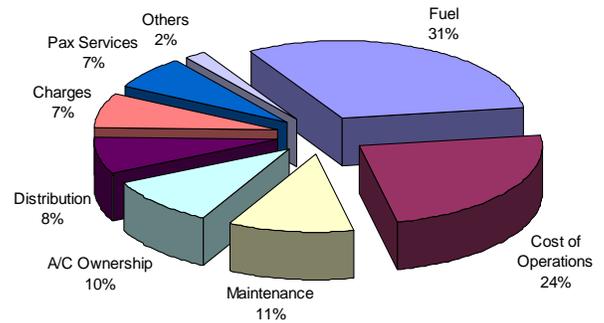
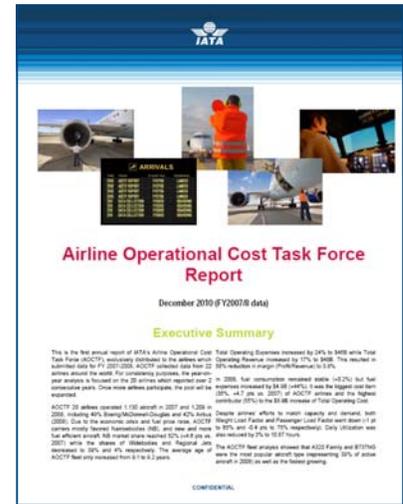
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IATA's Airline Operational Cost Task Force (AOCTF)

Similar in concept to the MCTF, IATA developed the Airline Operational Cost Task Force (AOCTF), a group of airlines focusing on matters concerning airline operational expenditures and measures to optimize them.

OBJECTIVES AND ACTIVITIES

- AOCTF's main task is to undertake annual collections of detailed airline cost data for major operational cost areas (including flight operational, maintenance, ground operational and systemwide operations), broken down by aircraft type or by route area when applicable.
- As the final delivery of AOCTF data collection, AOCTF member airlines receive an annual report, a key source of worldwide data, unavailable elsewhere, that can be used for benchmark purposes. This exclusive report includes:
 - ◆ Overview of the participating airlines in terms of fleet size, fleet types and operational data
 - ◆ High level analysis of financial performance
 - ◆ Analysis of operational data and cost structures as well as several key performance indicators (e.g. unit costs and yields)
 - ◆ Cost analysis per aircraft type
 - ◆ Cost analysis per route area
- AOCTF also aims at defining and standardizing the reporting of commercial airline maintenance costs.



BENEFITS FOR MEMBERS

- Benchmark with own airline's historical data and compare with their peers
- Be updated with the industry trends in terms of cost performance, cost monitoring and cost management
- Get the opportunity to network with airline industry professionals involved in finance and cost management, and exchange experience and best practices



Visit AOCTF website (www.iata.org/aocft)

Contact AOCTF at aocft@iata.org

PARTICIPATION

- Membership to the AOCTF and its Steering Committee is open to all airlines (including cargo, charter and low cost carriers) and IATA's Strategic Partners
- Nomination form for AOCTF's Steering Committee is available online at www.iata.org/aocft