



الهيئة العامة للطيران المدني
General Authority of Civil Aviation

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CIVIL AVIATION

Issue 67, November 2011, Thu Al-Hijjah 1432



**After more than 60 years
of Public Service**

An End of An Era



يتقدم سمورئيس الهيئة العامة
للطيران المدني وجميع منسوبي الهيئة
برفع خالص التهاني والتبريكات
لصاحب السمو الملكي
الأئير نايف بن عبدالعزير آل سعود - حفظة الله -
بمناسبة صدور الأمر الملكي الكريم بتعيينه
ولياً للعهر نائباً لرئيس مجلس الوزراء وزيراً للدراخلية
داعين الله العلي القدير
أن يعينه ويوفقه لخدمة دينه ومليكه وشعبه



الهيئة العامة للطيران المدني
General Authority of Civil Aviation

OUR GRAVE LOSS OF THE PRINCE

By virtue of specialty the approach of the editorials of this magazine constantly deal with topics related to Aviation Industry. But, in light of the death of the pioneer of the industry in our beloved country, Prince Sultan bin Abdul Aziz, we had to take a different approach. He has put all the seeds for the Saudi aviation industry with all the tremendous and vital projects, including close to thirty airports, and he who patronized the procurement of the-state-of-art aircraft fleets to our national carrier. As our industry is related to aircraft and airports, then our loss of the procurer of the aircraft and the builder of the airport must be grave.

But that is not all, his royal highness abilities and characters are much further, he had been a first-class statesman; a figure in benevolence and charity; a man of vast experience who will never be substituted.

Therefore, it has been incumbent on us in GACA, to remain in extended grievances and long bemoan, for the late Prince. He had remained as a patron and the guide who bestowed his unlimited support to this deep rooted edifice since its inception as a directorate, then as General Presidency and further as a General Authority. He had patronized its journey from its inception until he witnessed it in its perfect shape, with prominent goals and great expectations to realize the intelligent plans and strategies and his modern vision and sublime mission and great goals as per his stated fundamentals and laid out programs. And at the same time he had continued to remain as the rational patron and the solemn guide.

With the departure of Prince Sultan, an important and unlimited chapter in the art of modern political leadership, accompanied by a brilliant chapter of the Arabian political history, has come to an end.

This country, as well as its neighboring states, and other countries, shall never forget his contributions and devotion most of his life. Therefore, words will never be as adequate to describe or satisfy his due rights. Documentarians will not be able to enumerate his achievements, and the civil aviation industry will never forget his grace and kindness.

He has been an unequalled personality where he had acquired the qualities of prudence, statesman and wisdom which are rarely matched. He had devoted his efforts, time, and convenience to his country for over sixty years. He was

appointed to several high posts including the minister of Agriculture and later Transportation. Finally he settled in the Ministry of Defense and Aviation which he established and remained, throughout a period of about half a century, striving hard to modernize its capabilities, operations and human resources. At the same time, he extended his patronage to the Civil Aviation industry, as the chief in charge of this sector.

He has been an authority per se, and a first-class politician, judicious administrator, outstanding leader, clear sighted, of vast experience and wise determination. His deep experience, wisdom and willpower had been severally witnessed for by regional and international distinguished personalities. It is no wonder that he established such status through the accumulation of knowledge, expertise and wisdom gained from the company of the founding King, followed by the succeeding kings, and the current King Abdullah, may Allah grant him good health.

As far as the humanitarian and social local domain, Prince Sultan, as described by his brother Prince Salman, had been a mobile charity organization.

Bestowing lavishly upon all people, always doing good without hesitation, at all times. He has been very kind to the poor and the needy, never turns down or disappoints who ever may approaches him asking for help.

On the other hand, as far as the Arabian and international political domain are concerned, his dynamic roll and influential personality and powerful presence of mind, are well known. He possessed an unequalled charisma, amiable to all persons with a pleasant personality and had been a shelter for whoever may be in a difficulty.

May Allah bestow his mercy on the benevolent, generous, of the exalted mannered who always exhibit his ready, quit and modest smile.

My special congratulations our new Crown Prince Naïf bin Abdul-Aziz, HRH Prince Salman bin Abdul-Aziz, the new Minister of Defense, and HRH Prince Sattam bin Abdul-Aziz the new Governor of Riyadh Region, may Allah support and guide all of them at all times.

Finally, I would like to greatly welcome HH Prince Fahd bin Abdulla, the President of GACA in its new formation as issued by a Royal Decree November 5th.

* VP, General Authority for Civil Aviation



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After more than 60 years of Public Service An End of An Era



With hearts full of sorrow, grief, faith, the citizens of the Kingdom of Saudi Arabia and the Islamic world have received the news of the death of their beloved prince, HRH Prince Sultan Bin Abdul-Aziz Al-Saud, the Crown Prince, Deputy Premier, Minister of Defense & Aviation, and Inspector General last Saturday 22nd of October, after a long suffering from illness. People were greatly shocked when they heard the sad news in the media and they kept praying deep from their hearts

asking Almighty Allah to bestow his mercy, forgiveness and blessings upon Prince Sultan and to let him rest in paradise and to reward him for all the good deeds he did to his religion and country.

Today as we bid farewell to Prince Sultan to his last resort, we remember the prominent leading role he played in this organization's long march. In this connection, we would like to focus mainly on the progress and development achieved in the civil aviation sector as it has received the Prince's direct attention for more than

four decades, from the beginning of development in the international civil aviation industry and the early concern showed by advanced countries to air transport as a distinguished contemporary means of transport. The efforts exerted by the late Prince Sultan in this area enabled the Kingdom's Civil Aviation sector to keep pace with these international developments.

His belief that civil aviation is an important and essential factor in the development of the differ-

ent aspects of life (educational, economical, social, etc.) in a country with an area of more than two million square kilometers, has played a major role in enhancing this sector's development. A close look into the history this sector will reveal that a considerable number of achievements were accomplished not just in accordance with the plans and programs laid down by HRH but also under his direct supervision.

At the forefront of his goals was the provision of an airport network that covers the most of the Kingdom. This led to the establishment of a network of airports, considered to one of the largest and most efficient in the Middle East. It reflects the extent of the development and progress that took place in the Kingdom. Composed of 27 airports of which 4 are international, this network links the Kingdom's outstretched parts with each other and with the rest of the world. The government has spent generously to build this network according to fully fledged feasibility studies that took into consideration many factors such as the Kingdom's strategic geographic location, the its religious status and the millions of people it receives each year during Hajj and Umra seasons, the population density of its regions, and the magnitude of the present and future economic and tourist activities. The government's concern was not just confined to the construction of airports but also covered provision of their required installations and various operational systems in accordance with international standards and specifications.

These airports have experienced a rapid increase in their

His Humanitarian and Charity Achievements

This is a very bright side of the late Prince. Most important is the foundation carrying his name (Prince Sultan Bin Abdulaziz Charitable Foundation) established in 1995, and is considered as a huge integrated organization with clear vision, mission and strategies that renders developmental, charitable, and social services. Among its most important projects and programs are the following:

- Prince Sultan Bin Abdulaziz City for Humanitarian Services.
- Prince Sultan Bin Abdulaziz Program for Medical and Educational Services.
- Prince Sultan Bin Abdulaziz Program for Charity Housing.
- Prince Sultan Bin Abdulaziz Center for Science and Technology.

number of passengers year after year till it reached 48 million passengers in 2010. During the same year air cargo traffic reached around 567565 tons while number of commercial flights reached 449878 flights.

After the airports infrastructure and systems construction phase was completed, the civil aviation industry entered into a new phase with new variables that were dictated by the nature of the successive international achievements in this dynamic industry. This was one of the great contemporary challenges that faced many countries. Consequently HRH issued directions emphasizing the importance of addressing these challenges with new thinking and strategies. HRH introduced changes in the sector's strategy and adopted a number of comprehensive development programs that enabled the sector to move several steps forward toward achieving its major goals. This was carried out within the

context of an overall strategic plan starting with the gradual transformation from a government body that entirely depends on the government budget to an independent entity that relies on its own generated funds.

To achieve this goal the General Authority of Civil Aviation (GACA) took several steps forward such as the execution of a number of huge projects in partnership with the private sector, such as Hajj and Umra Terminals Complex Development Project which was executed on BTO basis with a cost of SR1360 million.

The transformation process was characterized by reorganization of GACA's structure by separating sectors from each other. This led to the formation of three sectors: a regulatory body, operational sector, and air navigation. Based on these goals, many important quality achievements were accomplished under the auspices of HRH. These include, but are not limited to, the expansion works



witnessed by KAIA during the past few years within the North and South Terminals Expansion and Renovation Project which contributed to the alleviation of congestions and raising the standard of services. Next was KAIA New Project signed by the Prince for a total amount of more than SR 27 billion (US\$7 billion). This project will raise the Airports capacity to 30 million passengers per year. Also a program was executed for upgrading/ building a number of domestic airports

and rehabilitating others to give them an international capability. Furthermore, new airports were constructed such as Prince Abdul-Majeed bin Abdulaziz airport at Al-Ola. Late 2008, the late Prince Sultan signed the three international airports management contracts for a total amount of SR578 millions. These contracts aim at raising the standard of services rendered in the international airports in addition to operating them on commercial basis. Also under HRH's directions and after

approval of the transformation an integrated air navigation services program was implemented including adoption of training systems and programs and provision of new equipment and systems which helped GACA in improving the services it renders to air traffic in the Kingdom's airspace and airports, i.e. landing, takeoff, and transit. GACA has licensed two new national airlines to operate side by side with Saudia. This has created a new competitive atmosphere and introduced new seating capacities.

HRH's achievements were not limited to the aforesaid but far beyond. Looking back into his achievements in the national level one can see his tracks and touches quite clear in a lot of the sectors he had managed. These touches reflect his remarkable talents represented by his deep thinking, oversight, and ability to take the right decision in the appropriate time. He has succeeded in utilizing his abilities and talents to greatly contribute to the overall development of the country. The prince was awarded numerous medals, certificates and awards, recognizing his contributions to different areas of life. Those awards were domestic, regional and international.

The Prince was appointed to several high ranking posts. Here we mention some of the most important:

- Governor of Riyadh (1947-1953).
- Minister of Agriculture (1953-1955).
- Minister of Transportation (1955-1962).
- Minister Defense & Aviation (1962-2011).
- Second Deputy Premier (1982-2005).
- Crown Prince and Deputy Premier (2005-2011).
- Chairman of the Board of Directors of the Saudi Arabian Airlines (1962-2011).
- Chairman of the Board of Directors of the GACA (2004-2011).
- Chairman of the Higher Council for Islamic Affairs.
- Deputy Chair of the Higher Economic Council.
- Deputy Chair of Higher Council for Manpower
- Chair of the Ministerial Committee for Administrative Development.
- Chair of the Higher Committee for Education Policy.

Meeza will run VIP lounges

Dr. Faisal H. Al-Sugair signed on Sunday Oct 9, 2011 a 15 year contract with Meeza company to develop and operate VIP lounges at airports across the Kingdom.

According to the contract, special lounges have to be developed and operated in 12 major airports. They include King Abdulaziz International Airport in Jeddah, King Fahd International Airport in Dammam, King Khaled International Airport in Riyadh, Prince Muhammad Airport in Madinah, Hail Airport, Abha Airport, Taif Airport, King Abdullah Airport in Jazan, Prince Sultan Airport in Tabuk, Qassim Airport, Najran Airport and Prince Abdul Mohsen Airport in Yanbu.

Following the signing, Dr. Faisal Al-Sugair said the authority promoted private sector invest-



ment in civil aviation facilities and services for the benefit of passengers.

He said GACA has the responsibility to bring civil aviation services in line with international standards. He also hoped that the contract would help achieve GACA's desired goals to serve passengers in an exemplary

manner.

He said the transfer of services to Meeza would be completed in one year, starting with King Abdulaziz Airport in Jeddah. He added that Meeza was selected from nine short listed bidders.

Initially, 49 Saudi and international companies had applied for the contract.

Major expansion projects in Malaysia Airports

Malaysia Airports, which manages and operates 39 airports in the country, is in the middle of a number of major upgrade and expansion projects. Last year the company started work on the expansion of Penang International Airport (PIA), which is due to be completed next June. The RM250 million (US\$82m) project will result in a near doubling of the terminal area from 296,017 sq ft (27,500m²) to 559,741 sq ft (52,000m²), enabling passenger throughput to rise from today's 3.5 million to five million per annum and provide space for extra aircraft parking

bays, immigration, customs and security screening facilities, plus extra baggage reclaim carousels and more car parking spaces. PIA handled 3.8 million passengers last year.

Upon completion next April, a new low-cost terminal at Kuala Lumpur International Airport (KLIA), will replace a temporary facility which has been in operation since 2006. The new terminal will cater for the growing low-cost carriers (LCC) operating at the airport, primarily local operator AirAsia, and will be the largest purpose-built dedicated terminal for LCCs in the world, according to the airport authority. Low-fare travel accounts for around 16% of total air

travel in the Asia-Pacific region and 43% in Malaysia.

The 2,604,951 sq ft (242,000m²) terminal, located 1.25 miles (2km) from the main terminal, will initially be built to handle 30 million passengers. The LCC terminal is part of the airport authority's vision of making KLIA the "next generation hub", with a passenger throughput of over 60 million expected by 2014.

Elsewhere in Malaysia, the delayed expansion of Kota Kinabalu International Airport (KKIA) is scheduled for completion this December. The project includes a runway extension, a new terminal and expanded aircraft parking, all designed to boost annual capacity to nine million.

Source: Airports International

PMIA Development & Operation Contract Signed

On October 29th 2011, under the auspices of HH Prince Fahd Bin Abdullah, Assistant Minister of Defense & Aviation and Inspector General for Civil Aviation, and Deputy Chairman of GACA Board of Directors (at the time), a BTO contract for development and operation of Prince Mohamed Bin Abdul-Aziz International Airport in Madina (PMIA) were signed in Riyadh. The winner is Tayba International Consortium which is composed of 3 companies (Al-Rajhi Holding Co., Saudi Oger and TAV of Turkey). This makes PMIA the first airport in the Kingdom to be built completely based on BTO contract.

By virtue of this contract, the totally new airport project will be built on a total area of more than 4 million square meters. It includes the construction of new terminals with moving bridges for transporting passengers directly from terminals to aircraft, in addition to the construction of commercial facilities and support services buildings. Upon completion of phase 1 of the project by the end of 2015, the airport capacity will increase to 8 million passengers, and then to 12 million passengers in phase 2, if demand dictates, at the end of the contract term which is 25 years.

Prince Fahd explained that this contract comes in line with the policy set out by the late HRH Prince Sultan Bin Abdul-Aziz as Chairman of the Board of Directors of GACA which calls for activating the private sector's role, promoting its participation in airport projects, removing all obstacles hindering its participation, and availing more investment oppor-



tunities in air transport sector to ensure provision of high quality services to passengers and based on the latest international standards and to build, manage, and upgrade air transport infrastructure using most advanced systems.

Dr. Faisal Al-Sugair said this contract was well prepared to ensure provision of best services, attracting more passengers and air traffic, and handling the expected influx of more passengers in the coming years particularly visitors of the two Holy Mosques in Madina and Makkah, in addition to the employment opportunities that will be availed by the project in the aviation sector and working and interacting with international companies experienced in airport management and operation.

It must be mentioned here that GACA has hired international consultants to prepare the required documents. The list includes IFC as the main consultant, White & Case as the legal consultants, and the German Quei as the technical consultant during the project tendering phase and for the preparation of the technical, legal, and contractual requirements and evaluation of submitted proposals.

New Najran Airport in Operation

The General Authority of Civil Aviation (GACA) started operating the new Najran airport on Tuesday the 20th of september. Flights were directed to the state-of-the-art facility, which includes new terminals, control tower, and several technical and administrative buildings.

The first flight that the airport received came from King Abdul Aziz Airport in Jeddah.

The Najran airport is one of the new generation airports in the Kingdom. The new project, including passenger lounges for arrival and departures, was carried out at a cost of SR400 million.

"The airport is designed to receive wide-body aircraft

and will operate flights to neighboring countries. It has a capacity of 1.4 million passengers and 15,000 flights annually," said Dr. Faisal Al-Sugair.

"We have implemented this project as part of GACA's efforts to modernize the Kingdom's aviation infrastructure facilities," Dr. Al-Sugair said.

The new terminal covers an area of 13,000 sq. meters where six planes can park at a time. There are separate passenger lounges for the arrival and departure of domestic and international flights. Three air bridges have been provided for the boarding of passengers. The project included renovation of the air cargo building and the lounge for VIP passengers. A new building has been constructed for support services.

KSA Airport Traffic Highlights for First Half Year of 2011

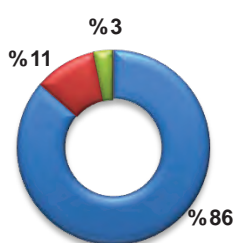
Air Traffic at International and Domestic Airports

Airports	First Half of Year 2011					
	Passengers (Thousands)	Change from 2010	Freight & Mail (Tons)	Change from 2010	Flights	Change from 2010
International Airports	21,775	15%	294,780	6.6%	184,245	3.5%
Regional Airports	2,669	12%	6,485	5.4%	27,310	2.3%
Domestic Airports	838	10%	1,011	-1.7%	12,820	-10.1%
Totals	25,282	14.3%	302,275	6.5%	224,375	2.6%

Airports' Shares of Total Air Traffic

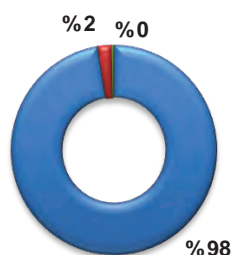
Passengers (Thousands)

- International Airports
- Regional Airports
- Domestic Airports



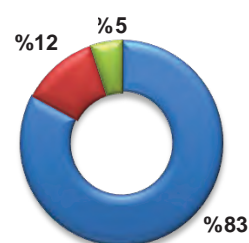
Freight & Mail

- International Airports
- Regional Airports
- Domestic Airports



Flights

- International Airports
- Regional Airports
- Domestic Airports



New Airlines' Operations have been Introduced at:

Airline	From/To (City)
Almasria Universal (Egypt)	Taif
Nile Airlines (Egypt)	Al-Gassim and Taif
Fly Dubai	Yanbu
Nesma	Taif and Yanbu

Top Ten Airports in Passenger Traffic

RANK	Airport	Passengers (in thousand)
1	KAIA (Jeddah)	10,617
2	KKIA (Riyadh)	7,034
3	KFIA (Dammam)	2,655
4	PMIA (Madinah)	1,470
5	Abha	826
6	King Abdullah (Gazan)	443
7	Prince Sultan bin Abdul Aziz (Tabuk)	370
8	Al-Gassim	252
9	Najran	236
10	Taif	215

Prepared by : Corporate Planning, Statistics



Another Look at Smolensk

Polish report says that a radar malfunction was involved in the Tu-154 crash

By Mark Lacagnina*

The report by the Polish Committee for Investigation of National Aviation Accidents said that the Tu-154 was not within flight-path deviation limits and concluded that the controller's guidance errors were caused by a malfunction or mistuning of the radar system at Smolensk Severny Airdrome. The aircraft struck terrain short of the runway, killing all 96 people aboard.

Similar to the report published last year by the Interstate Aviation Committee (IAC), the Polish committee's report primarily faults the flight crew for the accident, saying, "The immediate cause of the accident was the descent below the minimum descent altitude at an excessive rate of descent in weather conditions which prevented visual contact with the ground, as well as a de-

layed execution of the go-around procedure."

The IAC report said that the immediate cause of the accident was the flight crew's failure to proceed to an alternate airport after being told repeatedly that the weather conditions at Smolensk were significantly lower than the nonprecision approach minimums

The findings of the investigation committees appear to differ mainly in the extent to which air traffic control (ATC) and the presence on the flight deck of the commander-in-chief (CIC) of the Polish air force contributed to the accident. Compared to the IAC report, the 328-page Polish report gives greater weight to the former and less to the latter. It provides the following details about the accident flight:

The Tu-154 and a Yakovlev 40

operated by the 36th Special Airlift Regiment of the Polish air force were assigned to transport VIPs to Smolensk for a commemoration of the 70th anniversary of the Katyn Massacre during World War II.

Weather conditions at Smolensk deteriorated rapidly after the aircraft departed from Warsaw. The crew of the Yak-40, which was about 20 minutes ahead, was able to land at Smolensk but later told the Tu-154 crew that visibility had decreased to 400 m (1/4 mi).

As the Tu-154 neared Smolensk, the aerodrome controller told the crew that the airport had "unsuitable landing conditions." The commander replied, "If possible, we shall attempt approach, and if the weather is too bad, we will go around."

The commander told an aide to



Polish President Lech Kaczynski, who was among the passengers, that they would not be able to land and asked for a “decision as to what we are going to do.” The aide later returned to the flight deck and said that a decision had not been made.

The only instrument approach available was based on two non-directional beacons supplemented with radio locators used by a landing zone controller to inform pilots about their position relative to the threshold of Runway 26, the 2.7-degree glide path and the extended runway centerline. The published minimum descent altitude was 100 m (328 ft).

The air force CIC came to the flight deck as the crew was being vectored to the final approach course. Although he did not don a headset and spoke only twice, making an altitude callout at 100 m and a comment about “nil visibility” later in the approach, the report said that his (and the aide’s) presence on the flight deck was “unacceptable” and “could have distracted the crew and drawn their attention away from core duties.”

The landing zone controller advised the crew several times of their distance from the runway threshold, saying each time that they were “on track and path” although the aircraft was above the

Erroneous on-track, on-glide-path callouts by an air traffic controller during a radar-assisted nonprecision approach likely encouraged the flight crew to continue the approach despite the presence of thick fog, according to an independent report by Polish authorities on the April 10, 2010, crash of a Tupolev 154M at Smolensk, Russia.

acceptable glide path deviation limit and left of the extended centerline limit. The controller made the same callout when the Tu-154 later descended 20 m (66 ft) below the glide path and was 80 m (262 ft) left of the extended centerline.

The report concluded that the “absence of reaction” by ATC to the Tu-154’s flight path deviations was the consequence of a malfunction of the radar system’s gain adjustment, interference with the radar signals by trees that had grown beyond the permissible height along the final approach path or errors in the manual tuning of the system.

Early in the approach, the copilot reacted to terrain awareness and warning system (TAWS) “TERRAIN AHEAD” warning by adjusting the altimeter setting to

increase the indicated altitude and “fool the TAWS,” the report said. The crew did not respond to “PULL UP”

warnings generated later in the approach.

The Tu-154 was at a radar altitude of 91 m (299 ft) and 698 m (2,290 ft) from the runway threshold when the commander announced that he was initiating a go-around. He pulled the control column back and increased thrust, but the aircraft continued losing height due to inertia. A section of the left wing struck a tree and separated. The aircraft rolled inverted and struck rising terrain.

Among the “contributing circumstances” cited by the report was the crew’s failure to monitor altitude and respond to the TAWS “PULL UP” warnings, and the controller’s on-track, on-path callouts, “this might have affirmed the crew’s belief that the approach was proceeding correctly.”

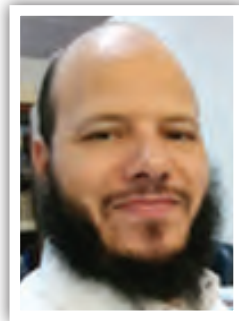
The report also is highly critical of the 36th Special Airlift Regiment, describing the flight crew’s training and preparation for the flight as “hasty [and] haphazard.” According to media reports, the regiment was disbanded in August, and government flights were reassigned to Poland’s commercial carrier, LOT Airlines ■

* Aviation specialist

When Composites nearly ended the dream of the Dreamliner!

Last month (September 2011), Japan's All Nippon Airways should take delivery of the world first Boeing 787 Dreamliner after the Federal Aviation Administration certified the aircraft for passenger service in August 2011. Passengers are expected to take their seats onboard the aircraft in November of this year. However, it is obvious by now to anyone in the civil aviation industry that the introduction of Boeing 787 Dreamliner to the market of air travel has taken more than expected. This aircraft program was more than three years behind schedule. Similar delays occurred previously on the world largest transport aircraft, Airbus A380. One major reason for both delays and particularly in the case of the Dreamliner is the significant increase of the use of composite materials in the design of these new aircraft. These aircraft include more carbon fiber reinforced plastic composites (CFRP) than any previous civil aircraft. As an example, according to Boeing sources, the 787 is made up of 50% composite materials (by weight) compared to the 777 12% composite.

In order to achieve the goal of lighter and stronger than metals, composite materials have to be highly designed, precisely



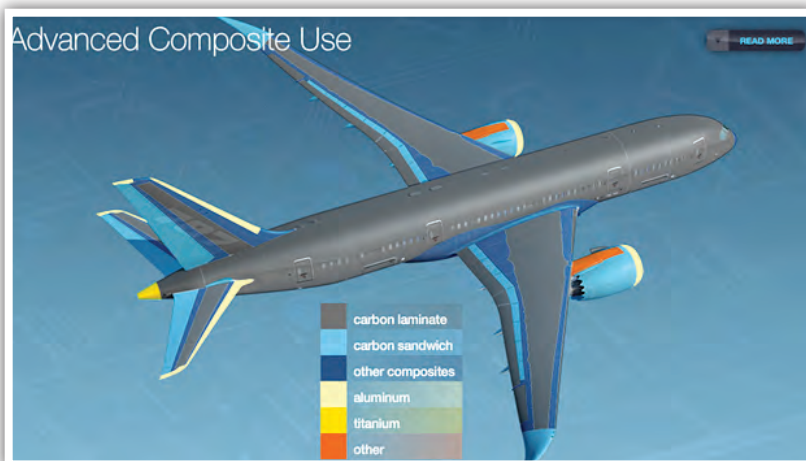
By Dr Mostafa
Burchak*

manufactured within a competing time frame and cost. If these factors are not present, then the final product can become what is labeled as “black aluminum”.

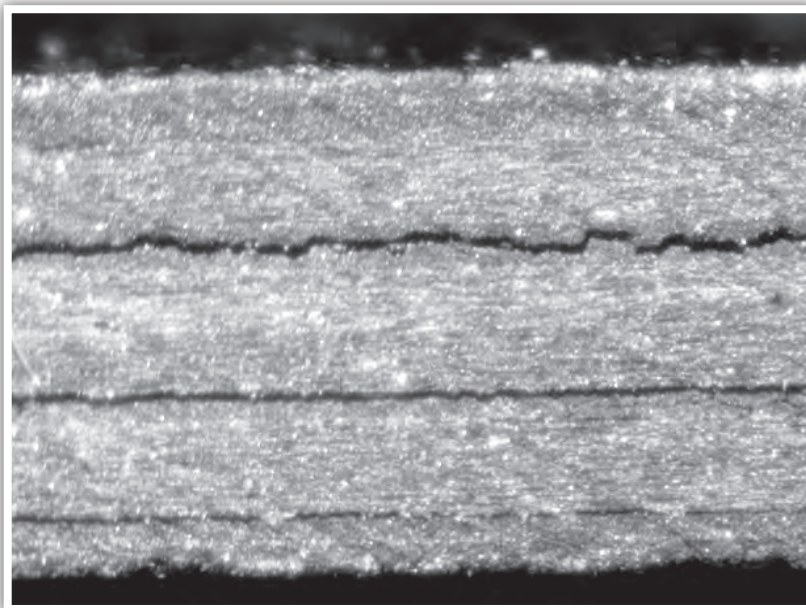
On the other hand, carbon fiber (CF) is stronger and lighter than aluminum and an aircraft made largely of CFRP will therefore be stronger and lighter than an aluminum aircraft but it will

cost more to manufacture and as already seen, delays in delivery will make it even more expensive (the Dreamliner unit cost is between US\$185 to US\$218 million). However, manufacturers like Boeing are pinning their hopes on the long term savings in the form of fuel and maintenance cost. These savings will however most likely materialize since CFRP have better fatigue characteristics than metals and should not suffer from the nucleation and initiation of cracks that are familiar in aluminum components used in aircraft.

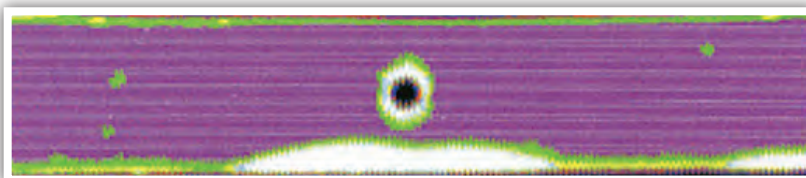
In May 2009, Boeing carried out a proof test on the Dreamliner's wing structure only for the latter to catastrophically fail below the ultimate design stress level. The wings which are manufactured by Mitsubishi Heavy Industries in Japan, suffered from delami-



Composite and metal structural components in the Boeing Dreamliner



Microscopic picture of Interlamina delamination in carbon fiber reinforce plastic composite plate due to matrix failure



C-Scan images of delamination at specimen edge and around notch after fatigue loading

nation in the composite stringers that are used to stiffen the skin. Small composite delamination will not necessarily lead to the aircraft catastrophic failure

but it has to be regularly and accurately inspected to avoid its spreading, something that will likely prove costly to the airlines in the future.

Composite structures found in the Dreamliner are principally made by bonding plies (laminas) made out of carbon fiber, glass fiber or aramid fiber to each other using an already pre-impregnated matrix system made out of resin and hardener. Laboratory strength tests revealed that although the composite material can sustain high levels of stress, matrix micro-cracking that leads to delamination can occur as early as 20% ultimate tensile strength. Although these micro cracks are not visible they can easily be detected using methods such as Acoustic Emission while under loading. What is worrying is that most of the damage occurs internally and can therefore be difficult to inspect in a large and complicated composite structure. Some of the promising non-destructive methods include ultrasonic c-scanning that is able to reveal internal damage but requires great effort to make it adaptable to all aircraft structural components. It is there anticipated that possible maintenance issues might arise from features in the aircraft structure where delamination might most likely occur as seen in the Dreamliner's wing skin composite stiffeners.

On another note, one hopes that the Rolls Royce engines chosen for the Dreamliner would not add salt to injury by blowing up as they did in the Qantas A380 in November of last year. ■

* Department of Aeronautical Engineering - King Abdulaziz University

European Low Fares Airline Association Statistics 2010

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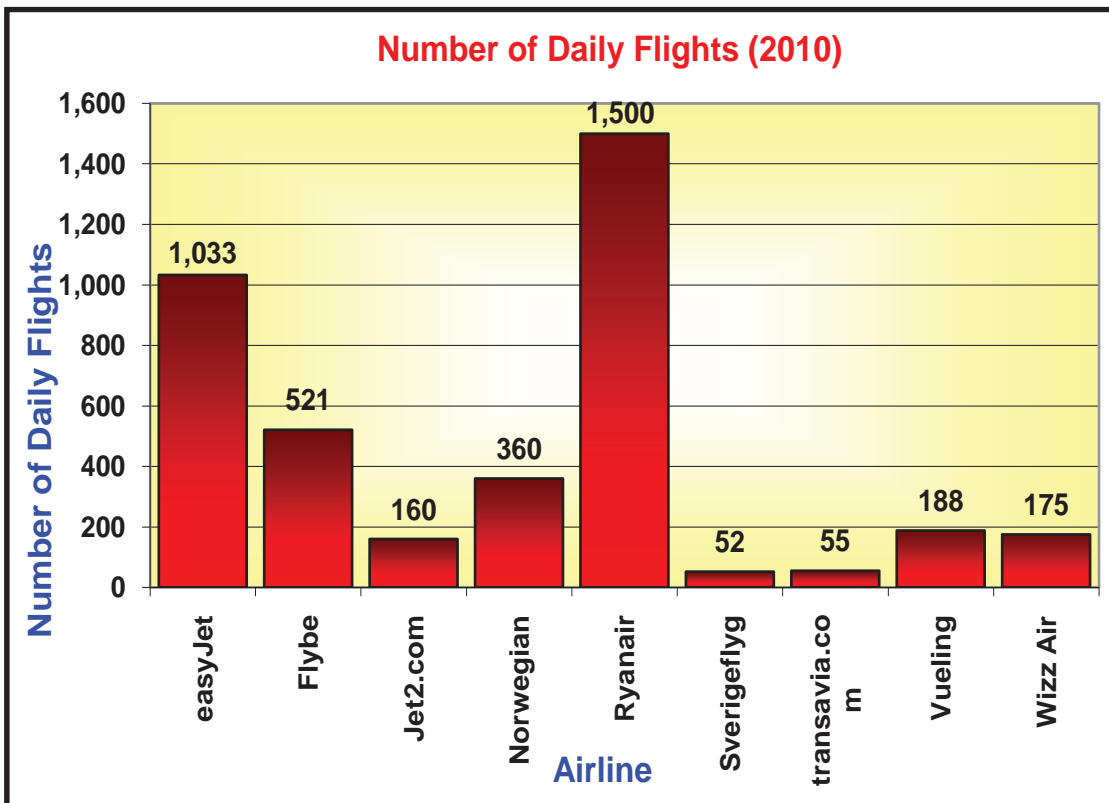
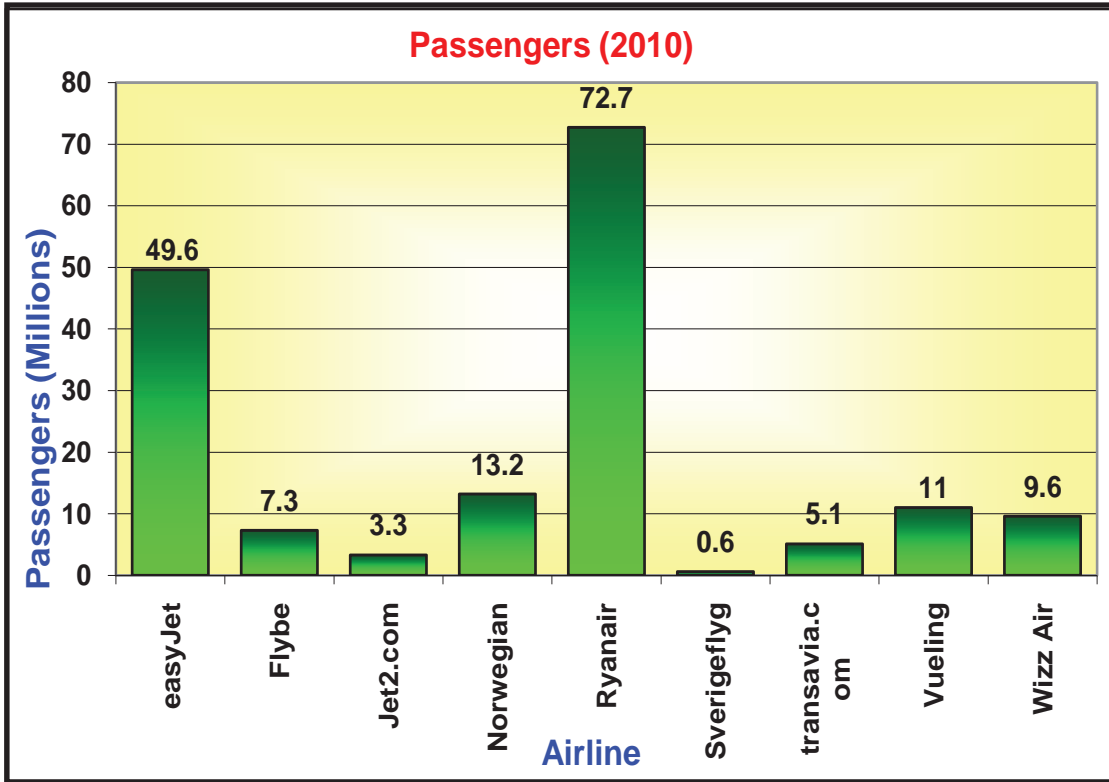
Airline	Country	Passengers (Millions) (2010)	Average Load Factor 2010	Number of Daily Flights Dec 2010
EasyJet	United Kingdom	49.6	87.2%	1,033
Flybe	United Kingdom	7.3	--	521
Jet2.com	United Kingdom	3.3	84.7%	160
Norwegian	Norway	13.2	78.0%	360
Ryanair	Ireland	72.7	82.0%	1,500
Sverigeflyg	Sweden	0.6	73.0%	52
transavia.com	The Netherlands	5.1	76.0%	55
Vueling	Spain	11	72.6%	188
Wizz Air	Hungary	9.6	84.0%	175
Total		172.4	82.3%	4,044

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Airline	Countries Served Dec 2010	Destinations Dec 2010	Routes Dec 2010	Permanent Employees Dec 2010
EasyJet	29	125	541	7,359
Flybe	12	63	165	2,939
Jet2.com	22	52	154	1,500
Norwegian	31	95	238	2,000
Ryanair	27	160	1,200	8,000
Sverigeflyg	10	21	30	130
transavia.com	22	96	126	1,871
Vueling	13	40	66	1,266
Wizz Air	25	69	221	1,280

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Airline	Number of Aircraft Dec 2010	Average Fleet Age Dec 2010	Fleet Type (Dec 2010)
easyJet	198	3.9	8 x B737-700, 190 x A320/A319/A321
Flybe	68	4.1	14 x Embraer 195, 54 x Bombardier Q400
Jet2.com	34	21	12 x B757-200, 22 x B737-300
Norwegian	54	8	30 x B737-800, 24 x B737-300
Ryanair	256	3.1	256 x B737-800
Sverigeflyg	10	13.6	5 x Saab 340, 2 x Saab 2000, 3 x ATR72/500
transavia.com	44	7.9	32 x B737-800, 12 x B737-700
Vueling	36	7.8	36 x A320
Wizz Air	34	3.6	34 x A320-200
Total	734	5.3	-



Source: ELFAA

Forthcoming Aviation Conferences, Exhibitions & Seminars

1 November – 30 December 2011

1 - 3 November

IATA-AEEC Electronic Flight Bag User Group Forum
 Berlin, Germany
iata.org/events/Pages/efb.aspx

2 - 3 November

Engine MRO Forum
 Istanbul, Turkey
aviationweek.com/events/current/mroeng/index.htm

5th Annual Future of Business Jets

London, UK
<http://www.quaynote.com/ankiti/>

2 - 4 November

IATA Global Aviation Human Capital Summit
 Singapore, Singapore
iata.org/events/Pages/hc-summit.aspx

the 3rd China Civil Aircraft Conference

Shanghai, China
cdmc.org.cn/ccac/

3 November

AAAE Airport Security Coordinator (ASC) School
 Phoenix, AZ, USA
<http://events.aaae.org/sites/111102/index.cfm>

3 - 4 November

12th Annual Asia-Pacific Airfinance Conference
 Hong Kong, China
<http://euromoneyseminars.com/EventDetails/0/4244/12th-Annual-Asia-Pacific-Airfinance-Conference.html>

4 November

Space Law
 Miami FL, USA
aeropodium.com/law/spacelaw.html

7 November

ACI-NA Concessions Conference
 Atlanta, GA, USA
aci-na.org/event/1507

7 - 8 November

Aircraft Asset Management Training School
 Dublin, Ireland
everestevents.co.uk/events.asp?eventID=59

7 - 10 November

2011 Airport Concessions Conference
 Atlanta, GA, USA
aci-na.org/event/240

8 - 9 November

European Airline Training Symposium
 Prague, Czech Republic
<http://halldale.com/eats-2011>

Invest and Manage Airports

London, UK
routesonline.com/events/145/invest-amp-manage-2011/

IATA Lithium Battery Workshop

Shanghai, China
iata.org/events/Pages/dangerous-goods.aspx

8 - 10 November

7th IATA Cargo Claims and Loss Prevention Conference
 Shanghai, China
iata.org/events/Pages/cclp.aspx

MRO Asia

Beijing, China
aviationweek.com/events/current/mas/index.htm

9 - 10 November

The Contribution of Flight Simulation to Aviation Safety
 London, UK
thirtythousandfeet.com/events.htm

10 November

Aviation Asset Management in the Middle East
 Dubai, UAE
aeropodium.com/conferenceprojects/aamme.html

12 - 14 November

7th International Aviation Trade show and Congress
 Cancun, Mexico
expo-ciam.com/

13 - 17 November

Dubai Airshow
 Dubai, UAE
aaco.org/EventsDetails.aspx?pageid=2560

14 - 15 November

GATE-Gulf Aviation Training Event
 Dubai, UAE
aaco.org/EventsDetails

14 - 16 November

4th ICAO Next Generation of Aviation Professionals (NGAP) and Trainer Plus
 Quito, Ecuador
ngap-ecuador.scilice.com/index.php?lang=en

15 - 17 November

Aviation Fuel Forum
 Paris, France
iata.org/events/aff/Pages/index.aspx

16 November

Operational Availability Guaranteed - The Civil Aircraft of the Future
 London, UK
thirtythousandfeet.com/events.htm

16 - 17 November

Lean Six Sigma for MRO Europe
 Amsterdam, The Netherlands
aviationweek.com/events/current/lssmeu/

7th edition of the international Airports Conference
 Warsaw, Poland
actiaconferences.com/airports-2011-conference.html

China Aviation E-Commerce Summit
 Shanghai, China
gisevents.com/events.php

16 - 18 November
8th ALTA Annual Airline Leaders Forum
 Rio De Janeiro, Brazil
aaco.org/EventsDetails.aspx?pageid=531

17 November
Airport Expo
 Dubai, UAE
aaco.org/EventsDetails.aspx?pageid=2552

17 - 18 November
IATA, ICAO and IFALPA Fatigue Risk Management Systems Workshop
 London, UK
iata.org/events/Pages/frms-workshop.aspx

21 - 22 November
ICAO Regional Aviation Security Conference
 Moscow, Russia
<http://www2.icao.int/en/AVSEC/Pages/RegionalAviationSecurityConferenceMoscow.aspx>

22 - 23 November
Airline & Airport Management in Central Asia
 Dushanbe, Tajikistan
aeropodium.com/onferenceprojects/

Aviation Crisis Management
 Brussels, Belgium
internationalairportreview.com/events/upcoming-events/

22 - 24 November
Expo Airport
 Sao Paulo, Brazil
<http://www.expo-airport.com>

28 - 30 November
AACO 44th AGM
 Abu Dhabi, UAE
aaco.org/EventsDetails.aspx?pageid=2242

ACI Europe & ACI Asia-Pacific 2011 Airport Exchange
 Abu Dhabi, UAE
airport-exchange.com/

29 - 30 November
5th Annual Flight Operations Conference
 London, UK
aircraft-commerce.com/conferences/London2011/default.asp

29 November - 1 December
Airline Engineering & Maintenance Latin America & Caribbean Conference
 Buenos Aires, Argentina
engineeringmaintenance-latincaribbean.com/

30 November - 1 December
Aerial Emergency Response International Conference & Exhibition
 Kuala Lumpur, Malaysia
bvents.com/events.aspx?tag=general-aviation&tagid=3493&p=3

30 November - 2 December
ICAO Regional Seminar on MRTDS: Biometrics and Border Security
 Singapore, Singapore
icao.int/icao/en/atb/mrtdsymposium/seminars/2011/singapore/index.html

1 - 2 December
2011 International Aviation Issues Seminar
 Washington, DC, USA
aci-na.org/event/238

EU-Russia Air Transport: Today and Tomorrow
 Brussels, Belgium
events.ato.ru/eng/events/airtransport

Airline Operational Efficiency Workshop
 Moscow, Russia
iata.org/events/Pages/ops-efficiency.aspx

4 - 9 December
Joint Fuel Purchasing Steering Board Meeting
 Dubai, UAE
aaco.org/EventsDetails.aspx?pageid=531

5 - 7 December
AAAE/RAA Airport & Regional Airline Executive Summit
 Memphis, TN, USA
<http://events.aaae.org/sites/111206/index.cfm>

2011 ACI-NA/ACC/FAA NEPA and Planning Workshop
 Atlanta, GA, USA
aci-na.org/event/1039

6 - 7 December
Airport Information Technology
 London, UK
internationalairportreview.com/events/upcoming-events/

6 - 8 December
Managing Aircraft Maintenance Costs Conference
 London, UK
aircraftmaintenancecosts.com/

7 - 9 December
AAAE/AMAC Airports Economic Forum
 Miami, FL, USA
<http://events.aaae.org/sites/091208/index.cfm>

9 December
Legal Aspects of Aircraft Lease Agreements
 Washington DC, USA
<http://www.aeropodium.com/law/aircraftleaseusa.html>

12 - 13 December
11th Annual AAAE/TSA/DHS Aviation Security Summit
 Arlington, VA, USA
<http://events.aaae.org/sites/111201/index.cfm>