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***** NEWSLETTER *****

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WORK HAS KEPT US OUT OF THE OFFICE FOR THE PAST TWO MONTHS AND IT WILL FOR THE NEXT SEVERAL MONTHS. IT IS CLEAN WORK IN AN AIR CONDITIONED OFFICE BUT

VALUEJET — We have passed the 10th anniversary of the VALUJET DC-9 accident so let us back up a little and revisit the event. Several months after the 1996 accident I was auditing the records of a leasing company client's DC-9-51. While going thru some Hawaiian Airlines Flight Logs (they had leased the airplane for several years). I came across an interesting Log Entry. "While approaching the airport (at Maui) we noted some electrical anomalies. After parking the baggage crew noted the forward cargo door skin & handle was very hot. They got a glove and opened it and were enveloped by smoke. The Fire department was called and the fire was extinguished."

An inspection disclosed the cargo compartment liner directly across from the cargo door was damaged. A maintenance crew from Honolulu arrived. They discovered damage to the insulation blankets, wiring and some secondary sheet metal structure. The HORIZONTAL STABILIZER TRIM ACTUATOR RELAY was severely damaged. Temporary repairs and another trim relay and provisional wiring were installed for the ferry flight to Honolulu, where permanent repairs were carried-out. I asked our local Service Difficulty Reports *guru* John Eakin (Air Data Research) for a list of SDRs related to the TRIM RELAY. He provided us with an interesting list of events including a report by a flight crew that noticed a hot floor (they were standing in the doorway waiting to greet the boarding passengers). "Hold the passengers!" The fire department was called — they discovered a "fire in progress". And there were others as "chilling". But did the NTSB follow up? Nooo! "We'll blame it on the time-expired oxygen generators". I spoke to the attorneys for the repair station that the FAA cited for improperly packaging the generators. The FAA didn't go beyond the packaging violation, but the private investigators working for them had looked at the same SDRs! They were prepared for the defense of any more serious charge but none followed.

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TWA 800 followed VALUJET. I appeared on NBC's dateline a few weeks after the accident with the role of answering the question — if it wasn't a terrorist act what could have caused it?

AND THEN . . . Partial Transcript of August 14, 1996 — NBC DATELINE

MURPHY: But it's easier for lawyers to win big damages for their clients by proving that the airline or the manufacturer is at fault so we wanted to hear the mechanical failure theory from someone else, someone who buys and sells used 747s for a living, someone who kicks the tires and looks under the hood, someone who knows the 747 inside and out.

(Voiceover) We found Jim Helms, an aeronautical engineer from San Antonio. He's not convinced yet one way or the other about a bomb or mechanical failure, but we asked how he could even explain an accident if it wasn't a bomb.

(Helms)

MURPHY: Is it possible on the 747-100 to have a catastrophic event, but have it not triggered by a bomb or missile?

JIM HELMS: Yes.

MURPHY: *(Voiceover)* While we're in the air, we may be blissfully unaware of problems, big and small, cropping up in flight. But every plane has a history, and airline crews and mechanics are required by law to report glitches when they find them, incidents like 'During cruise, smoke and electrical sparks appeared from overhead luggage bins,' 'Galley overheated and emitted smoke,' 'crack in left wing.' And those aren't just any samples. Those incidents are from the actual case history of the 747 that exploded. DATELINE pulled the FAA mechanical records on the aircraft called service difficulty reports going back for the last six years and found 42 mechanical write-ups. Then we asked Jim Helms to interpret them for us.

(Passengers on airplane; cockpit: airplanes: report; Helms)

Mr. HELMS: The majority of them were relatively minor.

MURPHY: *(Voiceover)* He's not saying it happened, but Helms says little things, an inconsequential spark here, a fuel

leak there, could meet with disastrous unprecedented results, even in a plane with a superb reputation. We know the central fuel tank was almost empty except for about 50 gallons of fuel sloshing around. Could it have leaked explosive vapors? Service reports from two other vintage 747s-not the TWA plane -- tell us that passengers and crews have reported in the past smelling fuel vapors. If fuel vapors in the tank of Flight 800 caught fire, it could be a massive explosion. But what could have ignited the fire?

(Plane: wreckage of TWA Flight 800; drawing of plane: service reports; graphic of wordy "fumes detected near row 20"; airplane)

Mr. HELMS: I would not overlook the main landing gear.

MURPHY: **So if the main landing gear is pulled up into the belly of the plane, they're ascending out of JFK, it's very near the central fuel tank hypothesis, speculation-- could an exploding tire rupture that center fuel tank?**

Mr. HELMS: **Yes.**

AFTER THE LOSS OF THE AIR FRANCE CONCORDE THE IMPORTANCE OF AIRCRAFT TIRES WAS BACK IN THE HEADLINES I wrote in our August 2000 issue of the NEWSLETTER

"CAA AND DGAC SUSPEND CONCORDE CERTIFICATES OF AIRWORTHINESS On August 16, the UK CAA suspended the operating certificate of the Concorde, and the French DGAC followed suit. Excerpt from the UK CAA press release:

The UK Civil Aviation Authority has accepted the recommendation from the joint Bureau Enquêtes d'Accidents (BEA)/UK Air Accidents Investigation Branch (AAIB), and suspended the certificates of airworthiness of the Concorde fleet.

The Accidents Investigation Authorities have reached conclusions regarding the cause of the accident. They have reviewed the evidence gathered to date and are confident that the first significant event in the sequence of the accident was the bursting of the front inboard tyre No: 2 on the left main landing gear.

The significant new development is the evidence now emerging that the tyre burst which occurred was, of itself, the primary cause of this accident. It is clear that a tyre burst alone should never cause the loss of a public transport aircraft (**some people have short memories**). At this stage of the enquiry what is uniquely different in this case is that tyre debris alone is thought to have led to

this catastrophic accident which has persuaded us to accept the recommendation from the investigation team.

THE SHORT MEMORY On March 31, 1986, a Mexicana Airlines Boeing 727-200 took off at 8:40 a.m. from Mexico City heading to Los Angeles. At 9:05 a.m. the pilot radioed Mexico City air traffic controllers “Emergency! Mexican 940 requests a return to Mexico City.” The 727 crashed shortly afterwards into the side of a mountain about 100 miles northwest of Mexico City killing all 166 passengers and crew on board. It was determined the aircraft was destroyed by a blowout of one of the tires. The tire had ruptured fuel, hydraulic and electrical lines as well as air-conditioning ducts that were near the wheel well. The aircraft had been modified for use as an extended range aircraft, and given the conventional fuselage’s confined spacing, the additional fuel tanks were also placed in the aft cargo compartment just aft of the wheel wells. (Airworthiness Directive 87-08-09 was issued the following year. This A/D requires that tires on wheels with brakes installed [the brake overheating causes the tire pressure to increase until the tire or wheel fails] to be serviced with NITROGEN – which will suppress any fire caused by overheating.) Unlike many, if not all 747 Classic Series, the 727 does not have brake temperature monitoring gages on the flight engineer’s panel.

TWA 800 A TIRE FAILURE? The body mounted main landing gears on the 747 are in close proximity to the aft wing spar (also known as the rear wall of the center wing tank). A tire failure could cause the same problem experienced by Mexicana. One of the right gear wheels, located closest to the wing spar on TWA 800, was missing its tire and the center fuel tank scavenge fuel pump.

WHAT HAPPENS WHEN A TIRE EXPLODES? Air Safety Week had an interesting article on the energy released by exploding tires in their August 7, 2000 issue. It was addressing the tire failure on the Concorde. If you go to page 3 (of that issue) you will find a chart – **Energy Released by Catastrophic Tire Deflations**. If you “used the same numbers” for a P-3 (Navy aircraft) main landing gear tire at 200 pounds per square inch (psi) tire pressure to approximate the energy released by a 747 main landing gear tire failure (194 psi) – it would be **301,071 foot pounds equal to 0.60 sticks of dynamite**. If the tire burst at the maximum pressure of 1,170 psi it would release 1,215,789 foot pounds of energy – an amount equal to 4.4 sticks of dynamite. NOTE: According to an article in the August 26th, 1996 issue of Aviation Week & Space Technology, one of the landing gear bogies was heavily damaged.

TWA 800 – REAR SPAR DAMAGE (From NTSB Exhibit 7 A – Structures)

A section containing a portion of the web from LBL 11 to RBL 33 at the upper spar chord and LBL 19 to BL O at 10” above the lower chord suffered damage on the entire periphery of the web, with the edges bent both forward and aft. The lower portion of the web was bent **forward approximately 180 degrees**. The

CWS scavenge pump is not attached to the spacer plate or the spar web [it was not found]. The mounting spacer plate for the CWS fuel scavenge pump remained in place on the aft side of the rear spar, but it had been deformed away from the spar web except at the 9-11 o'clock position. The three bolts that mount the spacer to the spar web were in place and the safety wires were still attached. There was a partially sooted outline of the pump housing on the spacer plate and a difference in soot levels on the forward side of the spar web where the pump is mounted as compared with the remainder of the web. There is only a very light soot deposit on the spar web where the spacer plate has been deformed from the web. The forward side of the lower portion of the web that is bent up 180 degrees has a location that shows impact damage to the web and to the fillet seals on the fastener heads. This section shows heavy soot and fire damage on not only the forward and aft surfaces but also on the web and stiffener fracture edges. It also shows marked difference of soot levels as compared with the adjacent segments. The stiffener to web interface at LBL 11 shows both sooted and unsooted regions on the interface where the stiffener is missing. The protruding portion of the fasteners that have failed also show soot accumulation. (See Fire and Explosion group notes for details of the sooting and fire damage). Two segments of the rear spar remained attached to stiffeners that remained attached to the keel beam box.

INTERNAL SIGNS The damaged center tank span wise beams (SWB) described in Exhibit 7A appear to indicate two areas of high pressure – between the front wing spar and SWBs 3 and 2 (the lower flanges of the front spar and SWB 3 are distorted forward and the lower flanges of SWB 2 and the mid-spar are distorted aft) – the other area is aft of the mid spar (SWB 1 and the rear spar show distortion both forward and aft). (SWBs are numbered from rear to front.) There is “interesting damage” between the mid-spar and the aft spar There is a puncture in the skin panel 6 inches forward of SWB 1 at LBL 37 with the surrounding skin bent down. The right end of this section has the general shape of an upward deflected dome that is as high as 14 inches in relation to the adjacent structure. The dome is centered about RBL 57.5 between S-8 and S-9.

IF IT WASN'T A TIRE FAILURE WHAT COULD IT HAVE BEEN (I can speculate – the NTSB can't.) One of the theories I presented during an interview on the NBC NightLine program a month after the accident was the igniting of vapors in the center wing tank (CWT) by the aircraft galleys. An early news article stated that damage to a passenger seat just aft of the galley may have been caused by an explosive under the seat.

If you search the FAA Service Difficulty Report (SDR) database you will find several reports of in flight fuel vapors – both in the cockpit and the passenger cabin (DURING CLIMB FUEL FUMES WERE DETECTED NEAR ROW 20). Airworthiness Directive 90-11-08 – B747-200 Front Spar fuel leaks – has two inspection area requirements. The front spar inspection does not pertain to the 747-100 but the second inspection, the upper wing skin of the CWT, for proper application of the secondary fuel barrier is relevant. The sealant is applied during production but it could have been removed during corrosion removal (the upper wing skin is a “popular area” for corrosion).

Now Go back to the SDRs and search for B747 Galley Oven Failures. Arcing and open flames are common malfunctions (I seem to recall one of the SDRs pertained to an oven on this aircraft).

And What do the flight attendants do shortly after an evening departure from JFK (to Europe)? Turn on the ovens to preheat them for dinner.”

We are strong believers of “numbers” — not that they “don’t lie” — but they are a good indicator. For example, at the end of the first quarter of 1996 the 7,019 *active* Boeing Jet Fleet had flown 281,681,460 hours on 171,921,029 flights. The high time aircraft was a 747 with 101,158 hours and 18,222 flights. TWA had operated various 707, 727, 747 and 767 Series aircraft for 12,382,293 hours and 6,142,541 landings including 1,477,961 hours and 271,537 landings with the 747 (Ref Boeing Jet Fleet Statistics Second Quarter 1996).

MORE NUMBERS — BOEING FLEET STATISTICS. . . THE TOTAL BOEING FLEET HAS, THRU 03/31/2006, FLOWN 472,245,117 HOURS AND ACCUMULATED 266,974,134 LANDINGS. THERE ARE 11,779 ACTIVE AIRPLANES. THE HIGH TIME (HOURS) AIRCRAFT IS A MODEL 747-200F. IT HAS FLOWN MORE THAN 115,000 HOURS. THE HIGHEST LANDING AIRCRAFT IS A 737-200 WHICH HAS ACCUMULATED MORE THAN 96,000 FLIGHTS.

THE FAA’s FAVORITE PROBABLE CAUSE — FUEL TANK WIRING . . .

. Most of the Boeing – classic series – aircraft have the same design fuel quantity measuring system. We estimate these aircraft have flown in excess of 350 million hours and 200 million landings without evidence of a fuel tank fire or explosion caused by faulty wiring. John Goglia, former USAIR mechanic and NTSB Member has an article in the July 2006 Aviation International News which includes “Although there had been other fuel tank explosions they are rare, and we still had not located an ignition source.” I ask John (who was a member of our Maintenance Recordkeeping Aviation Rulemaking Advisory Committee) and anyone else that cites fuel tank explosions to provide us with the “chapter and verse” that describes each one. I know of a Pan Am 707-300 Series that “suffered” a lightning strike at the wing tip fuel tank vent but no wiring related events.

As I finish this issue I am listening to the accounts of “the plot” to blow up aircraft enroute from Heathrow to the United States. Strange world we live in! I noted on the Delta Airlines *web site — no lap top computers in checked baggage and no carry-on on the flights departing Heathrow.* We were in London (at British Airways) on 9/11/2001. We contemplated returning home by steamship. If we were there today with our “lap tops” we’d probably take the bus to Paris and fly home from there (or take Cathay Pacific from London (if you can have carry-on stuff going that direction) to Tokyo and American Airlines to Dallas & San Antonio).

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