

# ALERT BULLETIN

AB 2006:30/3-11  
6/13/06  
691300

TO: Embraer-Empresa Brasileira Aeronautica S/A

INFO: FAA (AFS-230, AFS-200, AFS-300, AFS-900, ANM-100, SEA-AEG), AASC, AIA, AMFA, ASAP, ATA, IAM, ICASS, NATA, NTSB, PAMA, RAA, TWU

FROM: Linda J. Connell, Director  
NASA Aviation Safety Reporting System

SUBJ: EMB145 DIVERTED DUE TO LOSS OF FO'S AIRSPEED INDICATOR, WATER FOUND IN PITOT DRAIN

We recently received an ASRS report describing a safety concern which may involve your area of operational responsibility. We do not have sufficient details to assess either the factual accuracy or possible gravity of the report. It is our policy to relay the reported information to the appropriate authority for evaluation and any necessary follow-up. We feel you should be aware of the following:

ASRS received a report from a maintenance technician who described finding water in a pitot tube after the loss of the first officer's airspeed indicator. This is a follow-up to Alert Bulletin, 2006:25/1-2 "EMB-140 Airspeed and Altitude Indication Malfunction in Heavy Rain," which is enclosed.

The maintenance technician reporter stated that he/she was directed to an aircraft that was diverting due to an inoperative airspeed indicator. The reporter alleges the first officer's airspeed indicator went to zero after flying through heavy rain and turbulence. The technician stated that 6 to 8 inches of water was found in the first officer's pitot tube, however, to his/her surprise, none was found on the captains side.

(Keywords: Airspeed Indicator, Pitot Drain)

To properly assess the usefulness of our FYI service, we would appreciate it if you would take the time to give us your feedback on the value of the information that we have provided. Please contact Harvey Hartmann or Don Purdy at (408) 541-2800 or email at [hhartmann@mail.arc.nasa.gov](mailto:hhartmann@mail.arc.nasa.gov), [dpurdy@mail.arc.nasa.gov](mailto:dpurdy@mail.arc.nasa.gov).



Aviation Safety Reporting System  
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## ACN: 691300

### Time

Date : 200603

Day : Mon

### Place

Locale Reference.Airport : ZZZ.Airport

State Reference : US

Altitude.AGL.Single Value : 0

### Aircraft / 1

Make Model : EMB ERJ 145 ER&LR

### Person / 1

Function.Maintenance : Technician

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### Person / 2

Function.Oversight : Coordinator

Function.Other Personnel.Other : Maint Ctr

### Person / 3

Function.Oversight : PIC

Function.Flight Crew : Captain

### Person / 4

Function.Flight Crew : First Officer

### Events

Anomaly.Aircraft Equipment Problem : Critical

Independent Detector.Other.Flight CrewA : 3

Independent Detector.Other.Flight CrewB : 4

Resolatory Action.Flight Crew : Diverted To Another Airport

Consequence.Other : Company Review

Consequence.Other : Maintenance Action

### Narrative

I WAS ON A ROAD TRIP WHEN I RECEIVED A PHONE CALL FROM MY SUPVR TO CALL MAINT CTL. I CALLED MAINT CTL AND WAS TOLD THAT ANOTHER ACFT WAS BEING DIVERTED TO MY LOCATION. MAINT CTL FAXED ME A WORK CARD NUMBER TO DRAIN WATER FROM THE PITOT LINES. I WENT TO THE ACFT AND THE PLTS TOLD ME WHAT HAPPENED. THE ACFT WAS FLYING IN HVY RAIN AND BAD TURB AND THE FO AIRSPD WENT TO ZERO. WHEN THE ACFT GOT OUT OF HVY RAIN AND BAD TURB, THE FO'S SYSTEMS CAME BACK. THE WRITE UP STATED THE ACFT WAS ENRTE AT 35000 FT, A YELLOW IAS APPEARED ON BOTH AIRSPD TAPES FOLLOWED BY THE FO'S AIRSPD GOING TO ZERO. THERE WERE ALSO TWO OTHER WRITE-UPS ASSOCIATED TO THE FIRST ONE. I FOLLOWED THE WORK CARD AND DRAINED 6 TO 8 INCHES OF WATER FROM THE FO'S PITOT LINE. I CALLED BACK MAINT CTL AND TOLD HIM WHAT I FOUND. I ASKED HIM IF I HAD TO DO A PITOT/STATIC LEAK CHK AND WAS TOLD THAT IT WAS NOT REQUIRED BECAUSE OF WHAT I FOUND. I ALSO ASKED HIM IF HE KNEW ABOUT THE OTHER TWO WRITE-UPS. MAINT CTL SAID YES AND DRAINING OFF THE WATER IN ACCORDANCE WITH THE WORK CARD WOULD SIGN OFF ALL THREE ITEMS. I SIGNED OFF THE ITEMS AND SENT THE PLANE ON ITS WAY. WHEN I RETURNED BACK TO MY BASE, I TURNED IN MY PAPER WORK TO MY SUPVR.

CALLBACK CONVERSATION WITH RPTR REVEALED THE FOLLOWING INFO: THE RPTR STATED THE AIRPLANE WAS DIVERTED TO THE STATION WHERE THE RPTR WAS WORKING 'OFF LINE' ON ANOTHER OUT OF SVC AIRPLANE. THE CAUSE OF THE DIVERSION WAS THE FO'S AIRSPD INDICATOR WENT TO ZERO AFTER FLYING THROUGH HVY RAIN AND TURB. THE FO'S PITOT DRAIN FITTING WAS DISCONNECTED AND AN ESTIMATED 6 TO 8 INCHES OF WATER RAN OUT OF THE TUBE ONTO THE PAVEMENT. THE CAPT'S DRAIN WAS DISCONNECTED AND NO VISIBLE MOISTURE WAS NOTED. THIS WAS A SURPRISE AS SOME WATER WAS EXPECTED AND RPTR CAN'T EXPLAIN THE HUGE DIFFERENCE.

### **Synopsis**

AN EMB145 DIVERTED WITH THE FO'S AIRSPD INDICATOR AT ZERO. ACFT FLEW THROUGH HVY RAIN AND TURB. TECHNICIAN RPTS DRAINING 6 TO 8 INCHES OF WATER FROM PITOT DRAIN.



## ACN: 686541

### Time

Date : 200602

Day : Wed

Local Time Of Day : 1801 To 2400

### Place

Locale Reference.ATC Facility : ZHU.ARTCC

State Reference : TX

Altitude.MSL.Single Value : 29000

### Environment

Flight Conditions : IMC

### Aircraft / 1

Controlling Facilities.ARTCC : ZHU.ARTCC

Make Model : EMB ERJ 140 ER&LR

### Person / 1

Function.Oversight : PIC

Function.Flight Crew : Captain

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### Person / 2

Function.Flight Crew : First Officer

### Events

Anomaly.Aircraft Equipment Problem : Critical

Anomaly.Inflight Encounter : Weather

Anomaly.Other Anomaly.Other : Loss Of Flt Instruments

Independent Detector.Aircraft Equipment.Other Aircraft Equipment : EICAS Warning

Independent Detector.Other.Flight CrewA : 1

Independent Detector.Other.Flight CrewB : 2

Resolatory Action.Flight Crew : Overcame Equipment Problem

Consequence.Other : Company Review

### Narrative

FLT WAS CONDUCTED AT NIGHT. WX RADAR AND FORECASTS INDICATED HVY RAIN AND MODERATE TURB ALONG RTE OF FLT. ELECTED LOWER CRUISE AT FL250 (PLANNED FL330), DUE TO RPTED BETTER RIDES. INITIAL CRUISE WAS OCCASIONAL TO INTERMITTENT LIGHT CHOP IN LIGHT TO MODERATE RAIN. APPROX 40 MINUTES INTO FLT, TURB AND RAIN BEGAN TO INCREASE. RPTS INDICATED BETTER RIDES HIGHER, SO CREW OBTAINED CLRNC AND CLBED TO FL290. ONCE ESTABLISHED IN CRUISE AT FL290 WITH CAPT AS PNF, PFD 'IAS' COMPARATOR FLAG CAME INTO VIEW ON BOTH PFD'S, ALONG WITH EICAS 'SPS ADVANCED' CAUTION. USING THE STNDBY INSTRUMENTATION (ISIS), IT WAS EVIDENT THAT FO'S IAS (INDICATING 261) WAS INCORRECT (CAPT'S AND ISIS READ 237 IAS). CHANGED AIRSPD SEVERAL TIMES, BOTH INCREASE AND DECREASE, TO DETERMINE WHAT THE NATURE OF THE PROBLEM WAS AND DETERMINED THE FO'S IAS READ 261 IAS REGARDLESS OF ACTUAL ACFT SPD. IAS COMPARATOR AND SPS FUNCTIONS RESPONDED PREDICTABLY DURING EACH CHANGE OF AIRSPD, EXTINGUISHING WHEN ACTUAL SPD, AS JUDGED BY REMAINING INSTRUMENTATION, NEARED 261 IAS AND ILLUMINATING WHEN SPD DISCREPANCY AGAIN EXISTED. BEFORE WE COULD BEGIN TO ACCOMPLISH AOM PROCS, ATC DIRECTED DSCNT, SO CAPT ASSUMED PF DUTIES WHILE FO REFERRED TO AOM. DURING DSCNT, FO'S IAS INDICATION DECREASED WITH ACFT ALT UNTIL IAS READ LESS THAN 95 KIAS. SHORTLY THEREAFTER, EICAS 'CAS MESSAGE' CAUTION APPEARED, FOLLOWED BY AUTOPLT DISENGAGEMENT AND 'AUTOPLT FAIL' EICAS WARNING AND AURAL WARNING (YD REENGAGED SUCCESSFULLY). FO OBSERVED RED X OVER IAS, ALT, AND VS DISPLAYS ON HIS PFD. FO SELECTED REVERSIONARY MODE, AND SUCCESSFULLY REGAINED VALID INSTRUMENTATION FROM ADC1. NO ADC-RELATED MESSAGE EVER APPEARED ON THE EICAS. MAINT CTLR ASKED WHETHER THE FLT HAD BEEN OPERATING IN HVY RAIN. UPON LEARNING THAT IT HAD, THE CTLR OBSERVED THAT THIS TYPE OF FAILURE WAS KNOWN TO OCCUR IN CONJUNCTION WITH HVY RAIN. IT APPEARS, PENDING MAINT TROUBLESHOOTING, THAT ONE CONTRIBUTING FACTOR MAY BE A WEAKNESS OF THE ACFT IN DEALING WITH HVY RAIN. THE WEAKNESS SHOULD BE KNOWN TO PLTS SO THEY CAN BE AWARE OF THE POTENTIAL FOR THIS TYPE OF FAILURE AND BE PREPARED TO TAKE ACTION. ALSO, THE AOM COVERAGE OF THE IAS INDICATION PROBLEMS SEEMS VERY SKETCHY. IT ALSO DOES NOT PREPARE THE CREW FOR POTENTIAL LOSS OF THE AUTOPLT. IT IS NOT READILY EVIDENT WHEN REVERSIONARY MODE SHOULD BE SELECTED.

CALLBACK CONVERSATION WITH RPTR REVEALED THE FOLLOWING INFO: THE FLT MANUAL WAS OF LITTLE HELP IN SOLVING THE EQUIP FAILURE. ADDITIONALLY, THERE IS NO WARNING THAT THIS MAY OCCUR IN HVY RAIN IN THE MANUAL. HE WAS PARTICULARLY CONCERNED THAT IF ONE SIDE FAILED DURING HVY RAIN, THE CHANCE OF BOTH FAILING WAS GOOD WITH POTENTIAL SERIOUS CONSEQUENCES, ADDING THE FACT THAT MAINT INDICATED IT HAS HAPPENED BEFORE.

### **Synopsis**

EMB140 FLT CREW HAS THE LOSS OF FO'S AIRSPD AND ALT INDICATION DURING ENTRY INTO HVY RAIN. EICAS WARNINGS FOR SPD COMPARISON, AUTOPLT LOSS AND YAW DAMPER ILLUMINATED. THE FO, PF, SHOWED RED X'S (FLAGS) ON THE IAS AND ALT INDICATION.