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Submission date: 26-Feb-2021 11:28PM (UTC+0300)

Submission ID: 1519108399

File name: Reported_Flight_Control_System_Difficulty_on_EMB.edited_1.docx (25.15K)

Word count: 1017

Character count: 5629

Reported Flight Control System Difficulty on EMB-175

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The EMB-175 is a commercial jet designed and manufactured by Embraer company, a part of the E-Jet family. The EMB-175 aircraft was in service with various reputed passenger airlines such as Royal Jordanian Airlines and United airlines. Embraer aircraft company innovated and launched a program that enhanced the EMB-175 jet in terms of fuel burn by 5%. This was achieved due to aircraft being augmented and renovated with new wingtips, refinements to systems, and aerodynamics (Vernon, 2005). Embraer company has received more than 500 EMB-175 commercial jets, which play a vital role in ensuring that passengers' needs are achieved. Further research proves that Embraer company conducted EMB-175 maiden in 2003 with assisted the organization in obtaining certification in aircraft from different aviation companies such as in the United States and Europe.

Hazards and risks that caused control system difficulty on EMB-175

Pilots on a service republic Airway service analyzed the causes of the system difficulty on EMB-175, which occurred due to reduced ability to raise and lower Embraer 175 aircraft nose. A failure in system control on the aircraft led to the two 737 max crashes, which ended with fatality damage of property and death. As a result of the fatality damage, the national transportation safety issued more than 10 recommendations to Brazil aviation where EMB-175 commercial jet was designed and made (Berman, 2010). One of the major risks that pilots caused was ignorance in following emergency procedures implemented by the American Airlines Group to enhance passengers' and pilots' safety if such an incident occurs in the process of traveling. The NTSB said that the control system's failure on EMB-175 was also difficult for pilots to detect, which occurred on 737 max crashes that led to the death of 346 passengers.

In the Atlanta incident, NTSB found evidence of chafed wires which were believed to cause a short circuit that appeared to have triggered the control system difficult on the aircraft. In

Brazil, the safety board responsible for matters relating to aviation accidents decided to inspect similar wiring problems and examine whether the plane's emergency checklist needed to be revised since such cases had occurred in other cases such as EMB-170 EMB-190 (Goes, 2013). The organization also evaluated some of the major hazards that cause control system difficulty on EMB-175, which includes,

- a. Wind shear, this hazard can happen at any given altitude, but in most cases, it's more problematic at very low altitudes during planes take-off or when they are landing. An excessive and rapid airspeed loss on the final approach caused by win shear led to a dangerous uncomfortable close stall speed.
- b. Icing, this hazard occurs due to freezing temperatures and visible moisture in the atmosphere, which leads to low visibility, which affects the normal visibility suitable for aircraft. In most cases, severe icing occurs at the tops of clouds, and also, icing bands are no more than 3000 feet thick. Lack of effective plan by pilots in EMB-175 to evade voyage flight in the cloud tops led to a system failure that increased passengers' risk in the aircraft.
- c. IMC, unintentional flight into IMC is mostly considered as one of the fatal mistakes that most aviation organizations make. According to Nall Report's information, VFR flight into IMC accounts for over 25% of all facilities in GA flying. Weather deteriorating was also believed to be a cause that leads to the control system difficult on EMB-175.

Control measures implemented to control system difficulty on EMB-175.

After the control system difficulty on EMB-175, which was caused by wire chafing, the airplane maintenance manual organization recommended that the aircraft design the jet to adjust the mechanical stop bolt to reduce damages caused by wire chafing. NTSB also recommends that

ANAC require Embraer organization to develop effective instructions for operators of EMB-175 jet to inspect the wiring in the captain's and first officer's control columns for damage, replace them when needed, and also ensure that there is a proper authorization from adjacent components which includes forward mechanical stop bolt and its safety wire. NTSB further recommended that, once the effective inspection has been completed as outlined in the instruction developed by the Safety Recommendation A-20, ANAC required Embraer aviation company to review the inspection results, revise the design regarding EMB-175, and maintain the necessary documentation for Embraer EMB-175 to prevent any future hazards identified during the inspection period (Marvis, 2018). Regarding the same issue, NTSB recommended that once Embraer company revise the design and maintenance documentation for Embraer EMB-170/175/195 lineage 100o series airplanes as required by safety recommendation form 1-20, operators of the above airplanes had to incorporate the changes made.

According to pitch trim service bulletins that played a role in control system difficult on EMB-175, the Service Bulletins recommended that the owners and operators of EMB-175 had a role to play in implementing and installing an effective support system in the control yoke to prevent the incorrect installation of the pitch trim switch (Line, 2019). According to the service bulletins organization, the modification was to be accomplished within the next 7,500 flight hours immediately after the SB's issuance. NTSB also recommended that ANAC in cooperation and coordination with FAA and United States operators, determine if the changes made regarding Embraer 175 lineage 1000 series airplane pitch trim runaway checklists are required to adequately address all the probable trim system failures and make effective changes as necessary.

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