NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Western Pacific Region
Seattle, WA

February 3, 2011

AIRWORTHINESS ADDENDUM 2
CEN09MA142

A. ACCIDENT

Operator:	Empire Airlines, Inc.
Location:	Lubbock, TX
Date:	January 27, 2009
Time:	0437 central standard time (CST)
Aircraft:	N902FX, ATR-42-320

B. PERFORMANCE INFORMATION

On November 18 and 19, 2010, the investigator-in-charge (IIC), Operations Group Chairman, and the Performance Group Chairman visited the facilities of ATR in Toulouse, France. During the visit, additional performance an d flap system information was provided by ATR.

As noted in the Airworthiness Group Chairman Factual Report, if the flaps are commanded to extend or retract and asymmetry between the left and right flaps exceeds the predetermined value[1], torsion of the torque detection shaft connecting the two inboard flaps causes microswitch 5CV to close. This microswitch then supplies self latching relay 4CV, cutting off supply to the flap control switch unit. The extension or retraction solenoid valve is no longer energized, and the flaps remain in the position reached before the power supply cut off. Movement of the flap control lever now has no effect on the system and the indicator provides the average position reached by the flaps.

During the November 2010 meeting, ATR personnel indicated that when the flap asymmetry occurred, the left flaps were extended approximately 10° and submitted to aerodynamic pressure,

[1] According to ATR, the flap asymmetry range varies between 8 to 10 degrees, dependent upon the flap position selected.

with the left flap actuators compressed under hydraulic pressure. The right flaps were in the retracted position. As the four flap actuators are hydraulically connected, if blockage of the right flap extension is removed, the hydraulic pressure can result in the extension of the right flaps. A movement in the flap position was recorded on the digital flight data recorder (DFDR) at 0436:02 CST. By system design, once the system equalizes itself through a balance of aerodynamic effort on the left and right flaps, the movement stops.

Additional information related to the airplane performance can be found in the Performance Study Addendum.

Spoiler System

The two spoilers, one installed on each wing upper surface, have a roll control function. The command orders are mechanical and are transmitted to hydraulic equipment to actuate the spoilers.