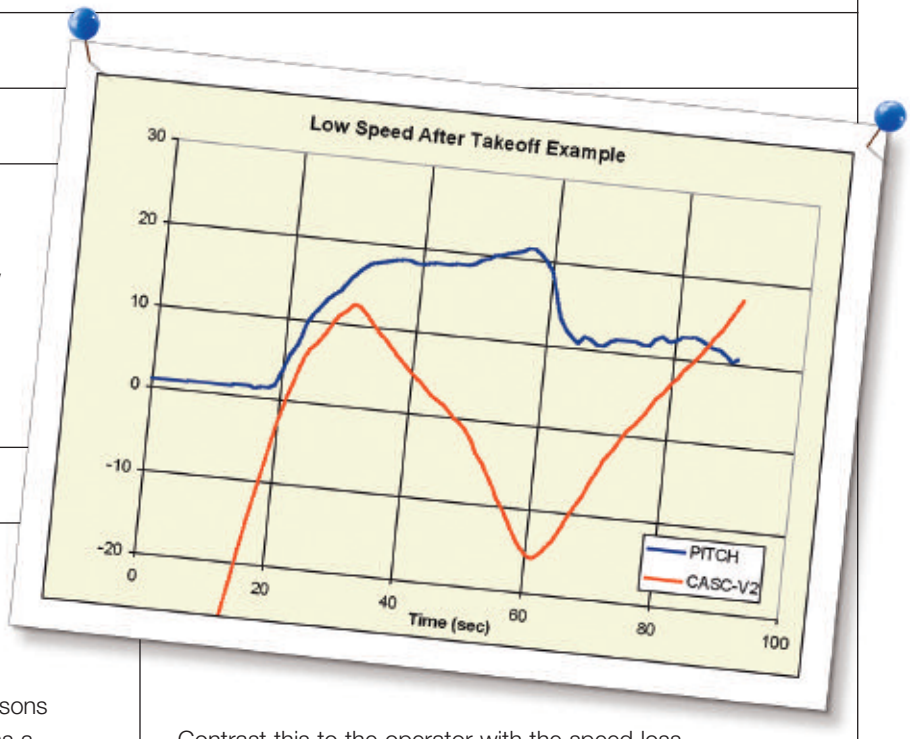
FOQA/FDM Case Study 2

Low Speed After Take Off

Page One

Events

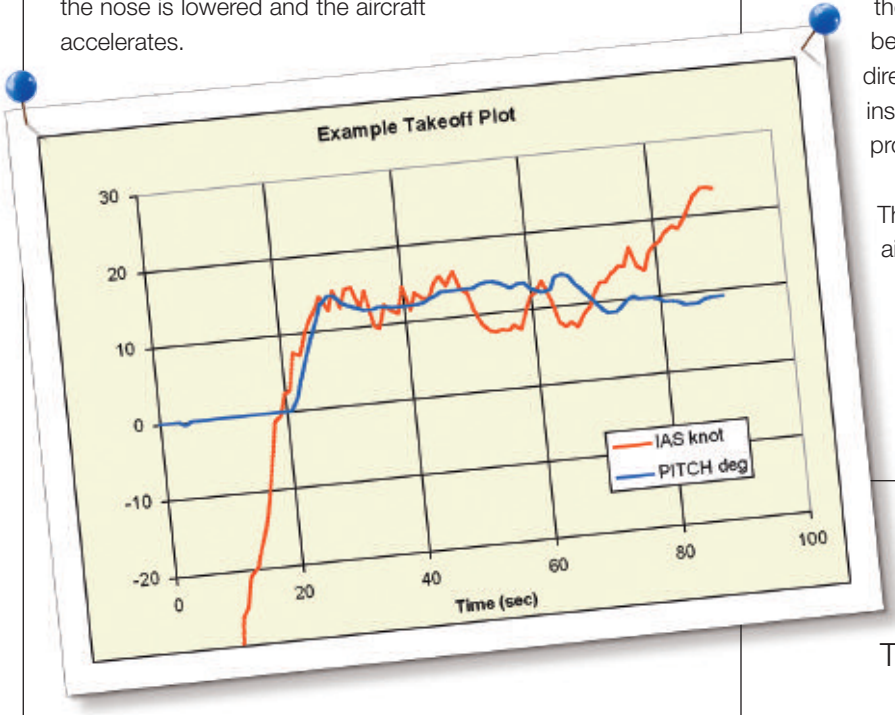
One FDS customer started to operate a type that was new to that airline. It fairly soon became apparent that there were a significant number of low speed after takeoff events. Some of these featured significant loss of airspeed and excessive pitch attitudes.



Investigation

The first stage of the investigation was to check the facts. FDS ensured that the aircraft weight information was correct, that the V2 speed was in accordance with the aircraft flight manual, that the airspeed and attitude information was valid. Comparisons were then made to other operators to see if there was a difference that would indicate the cause of the problem.

The takeoff plot from another operator shows the airspeed increasing during the takeoff roll to Time=20 seconds when the aircraft rotates. The 15 deg nose up attitude in the initial climb ensures the climbout is at about V2+15 knots before the nose is lowered and the aircraft accelerates.



Contrast this to the operator with the speed loss problem. As the pitch attitude passes 15 deg, the airspeed is starting to fall but the nose continues to rise to over 20 deg and the airspeed has fallen to a minimum of V2 – 15 knots.

There was a suggestion that the aircraft was not being flown correctly, but modelling work by FDS demonstrated that the technique described in the training manual was being followed. It was the pilots who followed the flight director slavishly and without reference to other instruments who were most likely to experience this problem.

The results of this investigation were passed to the aircraft manufacturer.

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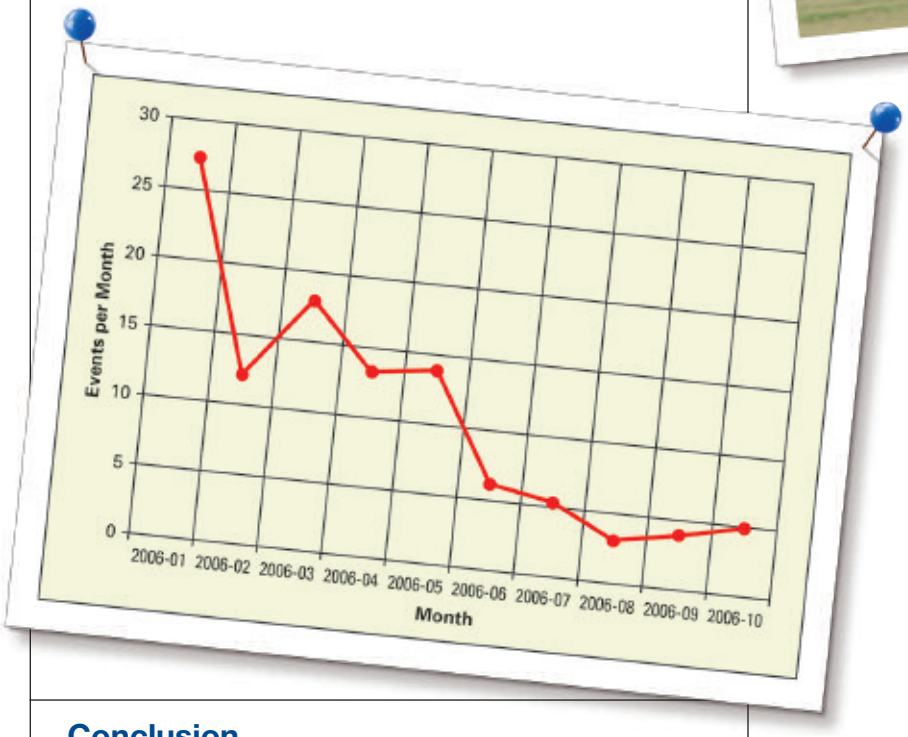
Solution

The aircraft manufacturer issued a software update, stating "…it has been reported that takeoff crossbar was moving instead of standing still at the desired pitch during rotation and subsequent takeoff … changes have been made to avoid this pitch guidance movement". This change, together with training that reinforced the need to maintain scan of the flight instruments, reduced the frequency of this event to almost nil, as shown in the trend graph below.



Conclusion

In this case FOQA/FDM alerted an operator to an unexpected feature of their new aircraft type. Refinement of their training allowed them to continue to operate the type safely.

FDS helps customers to identify safety issues in their operation and then achieve measurable reductions in event rate.

How will you improve flight safety in your operation?

Find out more

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