

# Fleet Sampling

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## Problem

Sampling can appear an attractive option for operators seeking to reduce the cost of FOQA/FDM but there are problems with this approach that could distort and invalidate the findings.

In theory, monitoring a representative selection of aircraft and applying the findings to the entire fleet should provide a highly cost effective method for improving procedures and systems. This is because fewer aircraft are equipped and there is less data to process. However, sampling requires **homogeneity across the fleet** and throws up real difficulties for Flight Safety Officers.

## Analysis

Sampling techniques can only provide reliable results when the aircraft, operation and crews are similar across the fleet being monitored. If the airline has two different types, conducts freight and passenger operations or operates in geographically different locations, the basis for sampling will be invalid.

Different crews can also present a problem. If an airline has a large influx of crews from a different organisation (when one airline takes over another, for example) there can be significant cultural differences that will distort results. Similarly, if the aircrews are aware that they are being monitored the results may not be representative of the fleet as a whole.

## Example

### Small airline with single Flight Safety Officer

In this hypothetical example, the airline sets up a FOQA/FDM monitoring programme using a few aircraft to give a representative sample of its operations. Initial results point to areas of the operation where pilots are not flying as they had been trained.

While preparing to take action to address these problems, the FSO receives a report that on one of the monitored aircraft



there was an EGPWS “Pull Up” warning. The flight data shows that the aircraft was very low in the recovery. However, the crew do not submit an Air Safety Report and the FSO has no other information to lead him to initiate an investigation.

There are three courses of action available, none of which is ideal:

### Option 1

The FSO can contact the crew concerned and ask them about the flight. While this will address the immediate issue of the flight with the EGPWS warning, the unintended consequence is that the crew will now know that, on this aircraft, their actions are being monitored.

A quick call to a friend in maintenance will tell the crew which aircraft are in the sample group. Soon all the pilots will know which aircraft they have to fly with care and which they can fly with impunity. The consequence is that **sample aircraft will no longer be flown in the same way as the rest of the fleet**, so the principle of sampling is no longer valid.



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## Option 2

Alternatively, the FSO can decide not to contact the crew. In accordance with the confidential nature of the work, the FSO cannot tell anyone else in the organisation about the event. Consequently, **the FSO shoulders the burden of knowledge.**

It is possible that the same thing has happened once or more on one of the non-monitored aircraft. The FSO has no way of knowing this. If some time later an aircraft crashes in the location where this EGPWS event occurred, would the FSO bear some responsibility for the accident?

## Option 3

Another option is for the FSO to publish an advisory notice on the flight safety notice board. Ideally, he should wait a while after the incident so that the crew in question do not associate their recent flight with the notice.

The advantage of this approach is that other crews are informed of the event and aware of the circumstances of the incident. The disadvantage is that **the FSO does not gain the benefit of the crew's perspective** on the event. For instance, there may have been an ATC issue that affected this incident that the FSO could only learn about by interviewing the crew.

In this example, if the FSO contacts the crew then the basis for fleet sampling is undermined. If the FSO does nothing then the officer is put in a difficult ethical position. The third option, to put a notice up, is probably the best compromise under the circumstances.

## Discussion

If an airline considers adopting a sampled FOQA/FDM system, it is important to consider the issues of homogeneity and the problems it presents the FSO when investigating events.

The airline should think through these types of issues beforehand and work out how they will respond to critical single events. If the airline management finds none of the options satisfactory then fleet sampling is not an appropriate solution for that operator.

FDS always recommends full fleet monitoring because it carries additional benefits:

- All serious events will be detected, not just those on the monitored aircraft
- Variations within the airline can be identified should they occur
- Statistical data will have less noise, giving earlier confidence in the data and more rapid identification of trends

## Reference

This Briefing Note is derived from part of a presentation given to the FAA Flight Safety Conference held in Denver, April 2006.

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