FSF Operational Flight Check Forum

Good morning

Ladies and Gentlemen. I'm honoured to be here today to give shape and provide context to what both Air New Zealand and the Flight Safety Foundation believes to be is a significant issue for our industry, and to lay down the challenge for all of us to look for solutions to this problem

I do this as the person responsible for Air Operations at Air New Zealand and having had to deal with the consequences of an accident which resulted in the loss of one of our aircraft, claimed the lives of two German pilots, four fellow Air New Zealander's and a valued member of our regulators team - the Civil Aviation Authority of New Zealand.

It's an experience that we at Air New Zealand don't want you to have to share.

The problem of course is the conduct of ad hoc non revenue operations including Operational flight Checks, post maintenance proving flights, other test flying, acceptance and divestment demonstration flights etc. The list in fact is quite long and thus the problem is potentially large.

Just a quick word on how we got here?

After the accident, which I'll talk to shortly, and having considered both the findings of the official interim report and having visibility to issues in the industry that came to light as part of an internal investigation I took the opportunity to discuss my concerns about flight checks with my fellow FSF member Capt Dave Carbaugh of Boeing. It was clear to both of us that this was something that needed serious consideration at an industry level.

As such, the Foundation has facilitated this forum and I'd like to thank Jim and the organising team for bringing it together and also for your attendance.

We have important issues to consider here over the next two days.

I intend to define the matter albeit by focussing on one type of operational flight check – that is an end of lease acceptance flight – by sharing Air New Zealand's experience and perspectives.

From this I hope we as a group, and as an industry, can hear the issue, consider the matters raised, and where necessary work collaboratively and openly to improve our collective performance in this area.

Many of you will be familiar with the circumstances of the Perpignan accident and I'm sure it will be addressed again by other speakers so I won't go into significant detail – but to recap – the flight in question was undertaken as part of a contractual leasing agreement between Air NZ and XL Airways. The aircraft which was owned by us was being returned to Air NZ after a two year lease and as part of that lease agreement, a demonstration of the aircraft systems was required before it was accepted back into the Air NZ fleet. It was then, and remains, Air NZ policy for all aircraft being inducted into the Air NZ fleet to be tested and accepted prior to entry into service. The lease contract specified that the flight(s) had to be run in compliance with "Airbus check flight procedures", by mutual agreement of the two operators. Prior to the A320 leaving Air NZ in 2006, agreement had been reached on the content of the flight check schedule put together by Air NZ. Air NZ had originally limited the content of the checks

due to the fact that the aircraft was only 12 months old, however, several checks were inserted into the flight check schedule at the request of XL Airways, one of which was a low speed check.

As we know, the crew of the A320 aircraft were undertaking a demonstration of the aircraft low speed protections when they lost control of the aircraft and it crashed into the sea. As I have said Air New Zealand had an observer on the flight deck and a number of personnel in the cabin as well as the CAA inspector.

There are many contributing factors associated with the accident and there are a tremendous number of learning's for the aviation community resulting from it however, the umbrella under which the flight was being conducted, in other words, a demonstration flight at end of lease, was and still is, a normal part of the commercial leasing agreements that exists today between airlines and leasing companies.

Notwithstanding the investigation that was being conducted by the BEA, the BFU, the NTSB and the NZTAIC, Air New Zealand undertook a very thorough internal investigation into our processes, not only to shed light as to any effect those procedures or processes may have had with regard to Perpignan but also given we had an ongoing requirement for operational flight checks

due to both maintenance needs and because of forthcoming end of lease obligations occurring across multiple types within the fleet.

As part of the investigation, and as is often the case, we looked to our peers for benchmarking and thus asked other Operators, both large, small and similar in size to us what they were doing with respect to flight checks. As such a number of operators and leasing companies were contacted.

The results from the airlines surveyed clearly showed that the majority were employing flight checking processes very similar to that used by Air NZ. That of itself only heightened our concern in that if others were doing essentially the same things as us then there existed a risk that this type of accident could occur again.

Basically there were a number of significant themes in regard to what we found viz:

- **The issue of policy and procedures employed while conducting these activities. This includes the airline and the regulatory framework**
- **The manufacturers relationship with airlines and the use of manufacturers checklists**
- **leasing company policies and procedures and expectations**
- **ongoing maintenance / airworthiness activities**
- **flight crew training,**

I will talk to these matters seperately.

Policy and Procedures

Firstly to the Regulators. Our view that overall the regulatory framework is less than optimal across multiple jurisdictions.

Generally regulators address the concept of these flights – but only to a certain degree and this varies. Some jurisdictions have the matter well defined, others less so, thus leaving gaps in the safety system. Some do not address issues in sufficient depth or at all.

The NZ Rules for these flights (other than type certification) reflects a fairly common regulatory position and considers the issue in the context of a post maintenance test flight. The rules address such matters such as pilot qualification for the type of aircraft, the expectations regarding aircraft performance, the requirement to make records of the flight and the issue of who should not be on board.

Across the board the matter of need, skills, competency and training are not well addressed.

Our observation is that some organisations doing these flights have a tendency to develop and conduct these tests as an evolutionary process based on modified experience and occurrences. We are not sure this is the correct approach.

So broadly speaking our observation is that the rules and processes both at a regulatory and airline level are in need of review and in some cases overhaul.

Manufacturers

The industry needs a greater level of support for these flights from manufacturers.

As you may know, when you buy a new aircraft one generally will receive a copy or copies of the manufacturers production flight checklist used in the certification of the aircraft ex build

An important point to note is that Manufacturers will not formally supply acceptance checklists unless you have purchased a new aircraft.

Receiving a subsequent aircraft from the manufacturer will normally determine the validity of the acceptance checklist an owner or airline has to

hand. If it has been some time since they received an aircraft, the checklist could, and most probably would, be out of date.

Also it's clear an aircraft out of build does not result in new checklist documents being distributed

Of the airlines surveyed, the majority of checklists being used for the acceptance or divestment of aircraft were based on the complete Manufacturers customer acceptance checklist. In-house customised checklists, (in other words sections removed or modified from a Manufacturers acceptance checklist) such as what Air NZ produced for the A320, were found to be few in number.

Some airlines are performing Certificate of Airworthiness tests in line with local Regulatory requirements (for example in HKG). To facilitate those Certificate of Airworthiness tests, airlines are using checklists based on the Manufacturers customer acceptance checklists. Again – unless new aircraft have been purchased then these may be out of date.

So in summary we had visibility that there were, and probably remain, many airlines conducting operational flight checks often using out of date checklists

When seeking support or clarification with regard to checklists or the status of checklists the manufactures were particularly reluctant to provide the information required.

I think we all know the reason for this sub-optimal situation – inter alia the legal implications.

As an industry we should collectively find this unacceptable and a solution to this issue found with alacrity. Obviously this will require the collective minds of manufacturers, airline representatives, aviation legal fraternity and the insurance industry

Leasing Companies

As I mentioned earlier, we also surveyed a number of aircraft leasing companies. This data, combined with our own experiences, indicated that there was a wide variance between the leasing companies of their requirements for when accepting an aircraft back from an airline.

Some Leasing companies require an abridged version of checks in line with the manufacturers acceptance check flight procedures to be conducted

before they would accept an aircraft back, others required the full acceptance checklist and in one case the Leasing company had their own customised version of checks taken from the Manufacturers customer acceptance checklist.

So I reiterate: there is a wide variety of requirements and needs rationalisation

I will now give you a couple of examples of this variation of approach we have observed at Air New Zealand

Since Perpignan Air NZ has still had to divest aircraft as part of our normal fleet roll-over programme. Given our learning's from Perpignan we had taken a policy decision not to expose our crew to what we considered unacceptable risk when conducting end of lease and other ad-hoc flights. We subsequently had an aircraft to exit and had extreme difficulty in agreeing with a particular leasing company as what was going to be in the checklist. When presented with the proposed schedule we refused to carry out a number of system tests that we felt could quite adequately be proven on the ground or by alternative means.

In this instance some compromise was reached but ultimately we did not accept items that the leasing company wanted and the aircraft exited the business without those tests being conducted. When asked directly for the basis of the flight test schedule the leasing company was of the view that their "tried and tested" processes had served them well for many years and did not need to be changed. In other words –"that's the way we've always done it".

I'll also note that the checks we refused to carry out were subsequently imposed on the delivery crew from the next airline. Their preparedness to conduct these manoeuvres is unknown.

One final observation. The Leasing agreement itself will generally not specify what is in an acceptance or divestment checklist, so it becomes a matter of 'horse trading' – often with individuals who hold a strong but possibly an inaccurate understanding of what is required and actually needed.

For the other example I'll refer you to the BEA final report where it is mentioned that there was an B737 end of lease flight that took place at Perpignan on the morning of the 27th Nov 2008 – the same day as the A320 accident flight. The flight crew of this aircraft were presented with a flight

check schedule consisting of some 50 pages, from the Lessor the evening before the flight took place.

I'll leave you to form a view as to whether that was a quality process, especially with regard to exposing the flight crew to an unnecessary level of risk.

Airworthiness and Maintenance

As many of you will be aware some legacy aircraft require flight testing to prove airworthiness. The B737 is notable in this regard and the 737 Maintenance Manual drives airlines to undertake check flights, specifically, the elevator power off check.

This check in itself has inherent risks for a crew not fully prepared and trained for an unexpected response. There was a well known example of this in January 2009 in the United Kingdom during a non revenue flight. It was qualified as a serious incident by the AAIB and I'm sure we will hear more about this event over the next few days.

There is a broad spectrum when it comes to the different generations of aircraft and subsequently the conduct of flight checks for airworthiness or post maintenance activity.

Flight checking of older aircraft is, at times, driven by the AMM requirements, (as in the example B737 elevator checks) however; generally there is nothing for later generation aircraft. Also, broadly speaking, older aircraft generally will have more frequent heavy maintenance checks ('C' or 'D' check) so are exposed more to post maintenance flight checks than newer aircraft.

Another issue for airlines is the in-service issues (affecting both early and later generation aircraft) such for recurring problems which are not easily confirmed as being resolved without subjecting the airframe to flight forces or air-loads e.g. in-flight vibration. However given the need by our maintenance colleagues to confirm aircraft status by conducting an in flight check post maintenance these flights will more than likely continue.

Selection and Training of Crew

This is an extremely complex aspect of this issue and our observations on this were mixed. For the sake of time and given I think we all broadly

understand the wider issue, Ill deal directly with the matters arising from our benchmarking exercise.

When it comes to crewing for these operations there is need to define the competencies needed, then establish the skills required, and subsequently develop the training to meet those competencies and skills sets.

The selection of crew (and this is not just about pilots) for these types of flights is an issue.

Do we see who has had previous test flight experience? Do you run the crew selection on experience, or is it a competency based assessment, such as a flight instructor or standards pilot

One observation was that many in our industry hold the view that it's about the piloting of the aircraft however Air New Zealand doesn't subscribe entirely to that view. A well qualified flight test facilitator who knows how the conduct the operations is equally and arguably more important to the safety of the operations. Knowing when to say no or to back out of a situation is an absolutely key attribute.

Finally as part of our internal investigation we did find some and I reiterate only some airlines who provided their own internal flight training to conduct flight checks, and this was normally in the domain of unusual attitudes and or manual reversion handling using simulators. Apart from the adequacy of training the difficulty here is the issue of simulator technology and fidelity given that simulators do not always reflect the aircraft characteristics at or outside the flight envelope.

So that's the problem - let's talk about solutions. We should also ask what success looks like. We should do that for this forum.

For Air New Zealand success is making these operations safer and providing a higher level of operational integrity.

Without pre-empting the outcomes from the next two days and given I have covered some of the main themes we found with our investigation, I'll throw my views on this to you now for consideration.

In the first instance we need to determine the actual need to conduct these types of flight. Do we need to do them and are we doing them for the right reasons?

All inherent risks associated with an operational flight check need to be recognised and treated accordingly. Today is a good starting point for us to identify and understand some of the key risks associated with this particular flight activity. Airlines in particular need to identify the level of risk posed by the type of flight through their own robust airline SMS and risk assessment processes.

Operationally airlines and those demanding these tests need to review their internal processes regarding the conduct these flights.

As an industry we need to create the environment where solutions are reached by way of negotiation where the commercial drivers for these flights such as leasing contracts impose changes or drive conflict.

Aircraft systems or components should only be checked in the air if they cannot be checked on the ground. Thus we need a shift in mindset of aircraft owners and airlines so that there is greater acceptance in checking of aircraft systems on the ground.

We also need to explore the use of existing, and the development of, technologies e.g. flight data monitoring programmes, to establish and prove the current state of an aircraft and whether this is an acceptable process for

airlines, owners and the regulatory authorities. We challenge the manufacturers on this issue

We also need the manufacturers to become part of the solution by working with the airlines and aircraft owners to provide support, guidance and assistance regarding the conduct of these flights – especially with regards to the flight profiles and checklists.

We need to continue to support the evolution and enhancement of the manufacturers training courses and ensure these are readily accessible and provided to airlines. While they have limitations these are useful and add value.

For the Regulators we need a more effective and consistent regulatory framework with a clearly defined set of Rules to cover all non revenue flights. The Rules should define the different types of flights (test flight, airworthiness flight check, demonstration flight check, acceptance flight check, etc) and the competencies and therefore training requirements for those that go out and fly them.

And finally as an industry we should consider whether this is actually such a complex and risky process that for some industry participants such as

smaller operators it should be placed in the hands of separate experts who provide this capability to the industry.

Thanks for listening. I hope that by hearing of Air New Zealand's experience that you, or the organisations you represent or even collectively we as an industry can go forward to make this type of operation more effective, operationally robust and ultimately safer.

Best wishes for the rest of the conference.

David Morgan