March / April 2007

VECTOR

POINTING TO SAFER AVIATION

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Crosswind Landings

Calling All Aircraft Operators

CAA
CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

VECTOR

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Calling All Aircraft Operators

There are fundamental changes to maintenance requirements from 1 March 2007. These changes affect every aircraft operator and maintainer. We provide a brief overview of the major changes and point you in the direction of further information. Key aspects are: be informed, plan ahead, and talk with your maintainer.

Cover: *The Omaka Fighter Collection's DH-2 photographed at Classic Fighters 2005*

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Manager Communications Bill Sommer.

Editor Peter Singleton.

Safety Education Publishing Team
Alister Buckingham, Dan Foley, Cliff Jenks, Jim Rankin, Anna Walkington, Rose Wood.

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The Classic Fighters airshow will be one of the biggest aviation events of the year, and a significant number of aircraft will be converging on the Marlborough area for the Easter airshow. The following article discusses some of the considerations you need to think about to fly to and from Woodbourne for the airshow.

Pre-flight Preparation and Publications

There are a number of documents you will need to be able to plan a safe flight to and from Classic Fighters. These include:

- An up-to-date *AIP New Zealand Vol 4*
- Visual Navigation Charts covering your proposed route and all alternative routes
- *AIP Supplement* 43/07

On the day of your flight, also remember to obtain weather information and NOTAMs.

AIP Supplement 43/07

The *AIP Supplement* 43/07 is available online at www.aip.net.nz. The importance of having read and understood the *Supplement* about Classic Fighters cannot be overstressed. **Read and make sure you fully understand the procedures it sets out.** Ideally you should be able to follow them from memory, but have them available for quick reference in the cockpit anyway. Use your passengers to help out. Brief them to point out all the aircraft they spot, as this may be one of the busiest traffic environments you will encounter in the air. Keep your head on a swivel, keep radio calls accurate and to the point, and follow all ATC instructions.

AIP Supplement 43/07 covers procedures for operating in the Woodbourne and Omaka area from 4 to 9 April 2007. There is a lot of information in this *Supplement*. Take the time to sit down and work your way through the procedures. Have a copy of the VNC to hand, with your planned route drawn on it.

Important Points to Note When Planning Your Trip:

- **Omaka aerodrome will be closed to all aircraft**, except those specifically authorised, from 0630 Wednesday 4 April 2007 to 1200 Monday 9 April 2007 NZST. All aircraft visiting for the airshow will be required to land at Woodbourne.
- **A temporary restricted area** NZR 694 will be established, covering the same area as the Woodbourne CTR/D (including both the Waihopai and Ponds VFR transit lanes) from the surface to 4500 feet AMSL. This will be active daily from 0630 to 1830, 4 April to 8 April 2007 NZST, or as advised by NOTAM, and from 0630 to 1200, 9 April 2007 NZST.
- **VFR Arrival Slots –** On Friday 6 April 2007, when NZR 694 is active, all VFR pilots must arrange to arrive at the visual reporting point Rarangi during one of the half-hour slots allocated for VFR arrivals. VFR pilots are to avoid operating in the Woodbourne CTR/D outside of these times. You must plan your arrival for the periods that the airspace is open, and given likely traffic delays, it would be a good idea to arrive at

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On Friday 6 April you must arrive at Rarangi during one of the VFR arrival slots.

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the start of the open slots, not towards the end, or you may miss the slot and be turned away or required to hold.

- Specific **VFR arrival and departure procedures** are detailed in *AIP Supplement* 43/07. You must plan to fly one of the published arrival procedures.
- **Holding and Fuel Requirements –** If the forecast or actual weather for Woodbourne falls below a cloud base of 2000 ft or the visibility reduces to 15 km or less, pilots can anticipate delays. There may be a requirement to remain outside controlled airspace, especially near Rarangi. All aircraft must carry enough fuel to hold for up to 30 minutes and then divert to a suitable alternative aerodrome, as well as their legal reserve of 30 minutes.

Omaka aerodrome will be closed from 0630 Wednesday 4 April 2007 to 1200 Monday 9 April 2007 NZST.

- On Saturday 7 April and Sunday 8 April, the airshow display days, **Woodbourne aerodrome will be closed** to visiting VFR and non-scheduled IFR aircraft from 0930 NZST. All VFR pilots must arrange to arrive at Rarangi before 0915 or after 1630 NZST on each day. Scheduled commercial operations will continue until 1245 NZST. Between 1245 and 1600 NZST, Woodbourne CTR/D will be closed to all aircraft except those taking part in the display.
- **Fuel availability at Woodbourne –** Avgas will only be supplied on request from an Air BP truck operating during the following periods: Friday 6 April 0800 to 1700 NZST; and Monday 9 April 0800 to 1700 NZST.

  Except for the above times, fuel will not be available at either Woodbourne or Omaka during the Easter period. Pilots will need to arrange their fuel requirements accordingly.

  This means that anyone planning to fly in and out on Saturday or Sunday will need to carry enough fuel for their flight to Woodbourne, 30 minutes holding fuel, plus the fuel required for their return flight home, with legal reserves. The alternative is to arrive a day earlier on Friday or depart a day later on Monday when fuel is available.

  Jet A-1 will be available on request from Air BP as detailed in *AIP New Zealand*.

Other Key Points

- Air Traffic Services within the Woodbourne CTR/D and NZR694 will be provided by Woodbourne Tower except on the display days from 1245 to 1600 NZST.
- All aircraft must have a serviceable VHF radio capable of transmitting and receiving on tower frequencies 122.8 MHz and 118.1 MHz, and receiving the ATIS on 128.2 MHz. Pilots must listen to the ATIS prior to contacting Woodbourne Tower for entry into the CTR/D, and prior to departure.
- Aircraft without an operable transponder will not be cleared to enter the CTR/D.
- Within the CTR/D pilots must turn on aircraft landing lights and anti-collision lights.
- If aircraft are required to hold within or remain outside the CTR/D, orbits should be left hand, with landing and anti-collision lights on.
- When reporting at the required inbound reporting points (detailed in the *Supplement)* expect to receive traffic information on the aircraft immediately ahead of you. Landing sequence number will be provided upon joining the circuit. Simultaneous parallel operations are permitted on the Woodbourne Runway 06/24 parallel grass and sealed runways for aircraft less than 5700 kg.
- To eliminate excess radio clutter, position reports should be accurate and concise. This is the basis of traffic awareness for all aircraft.

Flight Plans

Woodbourne Tower will not accept any flight plan requests or terminations. Flight plans are to be cancelled with the National Briefing Office by calling 0800 626 756 after landing.

When nominating a SARTIME, remember that you may have to hold for up to 30 minutes at the CTR/D boundary, and take into account the time required to taxi to a parking position and make a phone call to the National Briefing Office. Flight plans can be filed with the National Briefing Office prior to departure.

Time Pressure

To avoid the insidious danger of time pressure, it is a good idea to build in a weather contingency. Make sure that your boss and the owners of the aircraft you are flying are happy that you might not be back on Monday or Tuesday, but could be delayed by a few days if the weather turns bad. They will be happier to see you back safely a bit late, than to see you splattered on a hillside trying to get home at a fixed time. Have some back-up accommodation planned as well.

Weather is not the only source of time pressure. On departure from Woodbourne there may be a long queue of aircraft, particularly if you intend to fly out on Sunday after the airshow. You should also take into account the time it will take you to travel from Omaka to Woodbourne after the airshow finishes. Don't put yourself in a situation where a delay getting airborne will compromise a safe arrival at your destination. The Woodbourne CTR/D will be closed to all aircraft until 1600 NZST, and ECT at Woodbourne is 1827 NZST on 7 April. ECT is slightly earlier at most other South Island destinations.

There is also the possibility of significant congestion on the ground at enroute aerodromes, particularly around fuel pumps. Don't rely on being able to land and refuel without delay en route – you may find yourself number 10 at the pump, with an unplanned extra hour on the ground. Remember that Avgas will not be available at Woodbourne on Saturday 7 or Sunday 8 April.

Woodbourne Aerodrome.

Weather

The biggest factor likely to affect any cross-country flight is the weather. Your planning, flying, and contingency thinking must take into account the very real possibility that you will not be able to fly your chosen route on any given day. Make sure you obtain up-to-date weather forecasts for any cross-country flight.

Blenheim's Climate

Woodbourne and Omaka are situated in a unique micro-climate. The surrounding hills and ranges on either side of the Wairau Valley provide orographic protection from the weather and channel the surface wind as westerlies and easterlies. The prevailing wind direction is west or northwest. The surface wind, however, can be completely different at the two aerodromes; for example, a westerly wind can be reported at Woodbourne but an easterly can be occurring at Omaka from the sea breeze.

In the valley system there can be considerable differences between upper-level winds and surface winds. For example, southerly airflows in Cook Strait tend to become light to moderate easterly conditions at Woodbourne and Omaka.

During strong southerly flows, there is often a strong shear zone in Cloudy Bay at the edge of the strong southerly wind in the Straits.

Very low cloud can occur at Omaka and Woodbourne. This situation is most likely to occur when a broad northeast to east airflow originating from the subtropics, advects warm moist air into the area. In these conditions low stratus with a base of 300 to 600 feet with drizzle can occur.

During moist south to southeasterly winds through Cook Strait, low stratus in the Straits will be advected to the north and northwest of the approach areas and occasionally over Woodbourne and Omaka. At times this stratus remains as a cloud bank along the coast.

During moist airflows from the north, ahead of advancing cold fronts from the Tasman Sea, a low layer of stratus can develop. In these situations precipitation is normally present, with a lower cloud base about the hills to the north, and higher to the south over Omaka. At times, low cloud and rain that develops in the upper Wairau Valley and the Richmond Range will stay confined to the ranges, while Woodbourne and Omaka remain clear.

In general, the weather at Woodbourne and Omaka is better than in Cook Strait or the surrounding mountains. If you are able to fly VFR from your destination to Woodbourne then a landing should not be a problem. Conversely be aware that, when you depart Woodbourne, the weather conditions may deteriorate as you leave the CTR/D.

Summary

Detailed information on flying IFR into Woodbourne can be found in the September/October 2005 issue of *Vector* in an article called "Omaka & Woodbourne". You can read past issues of *Vector* on the CAA web site.

A flying trip to the Classic Fighters airshow can be one of the highlights of your year. A little bit of thought and preparation on your part can only enhance the experience, not to mention making it far safer and easier for you, your passengers, and other pilots. See you there. ■

A replica Fokker Dr1 Triplane at Classic Fighters 2005

Forced Landing in Difficult Terrain

In the January/February issue of *Vector* we published an article on forced landings without power. That article presumed an engine failure over flat terrain from a height of 2500 feet. As this is not always the case, here are some techniques that can be applied to improve your survival chances if faced with a power loss over inhospitable terrain.

Bush-Covered Areas

Although a landing into trees is not an attractive option, it can be a survivable one. Landing among trees should never be ruled out as an option, because it may be better than landing in other areas of very rough terrain. The following general guidelines should improve the odds of surviving:

- Use the normal approach configuration – full flap and landing gear down.
- Keep your groundspeed as low as possible by heading into wind. Looking at the movement in the tree tops can help you to determine the wind direction.

A prudent pilot will always have a forced landing plan when flying.

- Plan to land in areas of bush that contain as few large trees as possible – this will reduce your chances of hitting a large tree trunk. Low, closely spaced trees, with wide dense branches close to the ground are much better than tall trees with thin tops, because they will reduce your free-fall to the ground afterwards.
- Make contact with the tree foliage at the minimum possible airspeed, taking care not to stall, and aim to 'hang' the aircraft in the tree branches in a nose - high attitude. This helps to preserve the cockpit area by allowing the underside of the fuselage and wings to absorb much of the initial impact energy.

Mountainous Terrain

A landing in mountainous terrain is probably the most difficult situation a pilot can be faced with. Flying over large areas of inhospitable mountainous terrain should be avoided where possible to reduce the possibility of ending up in such a situation. Plan alternative routes that take your flight path over terrain where options exist, or fly at a higher altitude to give yourself more time in the event of an engine failure – even if it means adding extra time onto the flight. The following points should help to improve your chances of survival:

- Valleys and riverbeds are often a good option. It will depend on how tortuous the valley or riverbed is. It may be the best option when the valley sides are heavily wooded compared with more open parts on the valley floor. Consider landing downstream where slope is minimal, as water action settles riverbed stones in a downstream manner.
- Mountain ridges can provide useful landing sites, as they are often reasonably wide, may have fewer rocky outcrops, and are more likely to be of a constant gradient. Ridge top landings may also make it easier to assess wind direction. This can be very difficult to do in the mountains, unless drift is apparent, as opposed to valley landing sites where the wind tends to be multi-directional.
- Landing on a ridge line will mean that ELT transmissions are more likely to be received than they would be from landing sites lower in the valley. Your aircraft will also be more visible to search and rescue teams. A downside, however, is that temperature and wind-chill will be less favourable to survival. Also, if you miss the ridge line, it's all downhill from there!
- Try to avoid sites that have particularly large rocky outcrops or drop-offs. These may become difficult to manoeuvre around if the approach and landing are misjudged.
- If possible, select a landing site with an uphill slope.

Photos courtesy of TAIC

After surviving the forced landing, do you have the provisions to survive the night?

- When landing on a pronounced upslope, care should be taken to ensure that enough speed is maintained to change the aircraft's descending flight-path, just before touchdown, to match the gradient of the slope. It is possible to land an aircraft successfully on relatively steep slopes if enough speed is maintained. However, this requires sophisticated judgement that is gained from extensive training.

Ditching

Assuming that you have a choice, a well executed water landing (ditching) can provide less deceleration than a touchdown on rough terrain or into trees. Many pilots are reluctant to ditch, even though this might be a better option than the land-based alternatives. This is probably because of the fear of becoming trapped in the aircraft and the fact that it will, more than likely, sink. An aircraft that has been set down on the water at minimum speed, and remains intact, may float for several minutes. The buoyancy provided by air trapped inside the fuel tanks, in the wings, and in the fuselage should allow sufficient time to vacate the aircraft.

If you have a choice between a ditching and a forced landing, you should consider the following factors:

- Water is much harder than you expect when impacting at speed.
- Survival times may not be very long in the sea or a cold alpine lake. If you know the water to be extremely cold, then it may be wise to avoid ditching altogether.
- The proximity of the ditching area to land.
- How well your passengers can swim, and whether they have their life jackets on. Pilots have drowned after textbook ditchings, because there were no life jackets on board.

Whether ditching by choice, or necessity, the following techniques are a guide to increase your chance of carrying out a successful ditching.

- Try to ditch the aircraft as close to help as possible. Ditching close to beaches, boats, or shipping lanes will ensure someone will get to you as soon as possible.
- Retractable landing gear should be kept up to reduce drag in the water. This should prevent the aircraft nosing over.
- Ensure that all occupants have their harnesses tightly fastened – you do not want anyone to be knocked out during the ditching. Life jackets should be worn while flying over any expanse of water, but should be inflated only when clear of the aircraft.
- Avoid using full flap on low-wing aircraft, as this will cause excessive drag under the water line and possibly result in an asymmetric failure of the flaps and slewing of the aircraft.
- In light wind conditions, when the water surface is relatively smooth, an into-wind touchdown can be made.
- In moderate wind conditions, it is best to land with a crosswind. Aim for the crest of the swell and land along it. The danger of nosing into a swell is generally greater than that involved in ditching with a crosswind.
- In strong wind conditions, over 35 knots, plan your approach to land back into wind, as this will probably outweigh the danger posed by the swell system.
- **Depth perception can be difficult to judge when landing on smooth water.** There is a risk of either flying into the water, or of stalling at some height above the water and nosing in. To minimise this hazard, set up the approach at the minimum rate of descent and fly the aircraft onto the water.

Landing on Snow

While landing on snow can provide a cushioning effect, dangerous obstructions can also be hidden under a light covering of snow. Snow covering will also make it more difficult to judge the surface gradient and general topography of the landing area. Try to avoid areas where there might be patches of ice, as these will cause the aircraft to slide for much greater distances, increasing your chance of colliding with a solid object.

A landing on snow should be executed like a ditching, with the same aircraft configuration (except that low-wing aircraft should use full flap). Depth perception can also be difficult to judge when landing on snow.

Built-Up Areas

An engine failure while flying over a built-up area is somewhat more complicated, as it generally involves the safety of the people below. Rule 91.311 *Minimum heights for VFR flights*, stipulates that you must not fly over a built-up area at less than 1000 feet above the highest obstacle present (when operating within a 600 metre horizontal radius of it), and that you must always remain within gliding distance of a suitable emergency landing site.

With this in mind, you should not fly over built-up areas that do not have favourable emergency landing options, and resist the temptation to operate at heights

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where you are unable to glide clear. Get to know the forced-landing possibilities around your city before going flying. If you do find yourself facing an engine failure while operating over a large built-up area, turn immediately towards a known emergency landing area, eg, a park, a golf course or school playing field.

It is your responsibility as pilot in command to consider the safety of people on the ground when making this selection. If none of the above mentioned options are favourable, then a motorway which has double-lane traffic will allow you to touch down moving in the same direction as the traffic. It will also help you to pick a space between moving traffic more easily.

Decision Making

When faced with a forced landing in the 'real world', the decisions that you make will have a direct outcome on the success of the situation. There will always be elements of compromise in any emergency situation and you need to ask yourself, "What is the best compromise?".

Summary

The FLWOP has always been an important part of pilot licence training. For many of us, these forced-landing skills may have diminished somewhat over the years. It is therefore important that we remain familiar with them. Being totally familiar with the FLWOP drills not only allows you to make the most appropriate landing site selection, but also enables you to concentrate on the task of successfully flying the aircraft to that site. This sort of familiarity allows you to focus your attention outside the cockpit, where it should be, and reduces the tendency to become distracted inside the cockpit.

Minimise the time you spend flying over extensive areas of inhospitable mountainous terrain, large expanses of water, large areas of bush, and substantial urban areas. It is not worth taking the risk when an alternative route is available. The extra time and cost involved in selecting a safer alternative route, or higher altitude, is often not as great as you might expect.

A prudent pilot will always have a forced-landing plan when flying. This involves being aware of the wind direction, ground elevation, and possible landing sites below. It also involves knowing – as you are flying along – how you would execute an approach to these sites. "Would I fly a 'straight-in', approach given that I am only 700 feet agl?" The rougher the terrain, the more frequently you need to carry out this assessment. The more you ask yourself the question, "What would I do if the engine failed now?", the more prepared you will be to respond quickly if it ever happens to you. ■

A forced landing into difficult terrain requires good decision making while dealing with issues of compromise. Knowing your engine failure checks, and having a disciplined approach to your flying, will greatly improve your chances of a successful forced landing.

Airstrip Safety Guideline Published

The *Safety Guideline – Farm Airstrips and Associated Fertiliser Cartage, Storage and Application* has now been published.

This safety guideline is the result of three years of joint effort between a number of government and industry bodies, and it was developed under the auspices of the Health and Safety in Employment Act 1992.

It covers all aspects of aerial top-dressing, from fertiliser manufacture and transport, to storage and spreading, and brings together a set of agreed minimum standards to help the industry achieve safer levels of performance.

You can download a copy from the CAA web site, or for a bound copy, email the CAA Health and Safety Unit, hse@caa.govt.nz.

Crosswind Landings

Practising crosswind landings in New Zealand can be a tricky business. Trying to organise an aircraft, instructor, and runway while there is a consistent wind can be difficult. It is an essential skill to have, however, as more often than not there will be a component of crosswind in any given headwind.

A crosswind is experienced any time the wind is blowing at an angle to the runway. Here is one of many quick ways to calculate a crosswind component after receiving an ATIS/AWIB while flying.

If the runway heading is 340 degrees, and the wind is blowing from 300 degrees, then the difference between the two is 40 degrees. If we add 20 (mathematical constant) to this number, we get 60. The crosswind is therefore 60 percent of the headwind. In this example, 60 percent of the 20 knots blowing is 12 knots. The crosswind is therefore 12 knots.

This method works for a difference of up to 80 degrees between runway heading and wind direction, because after that the crosswind becomes close to 100 percent.

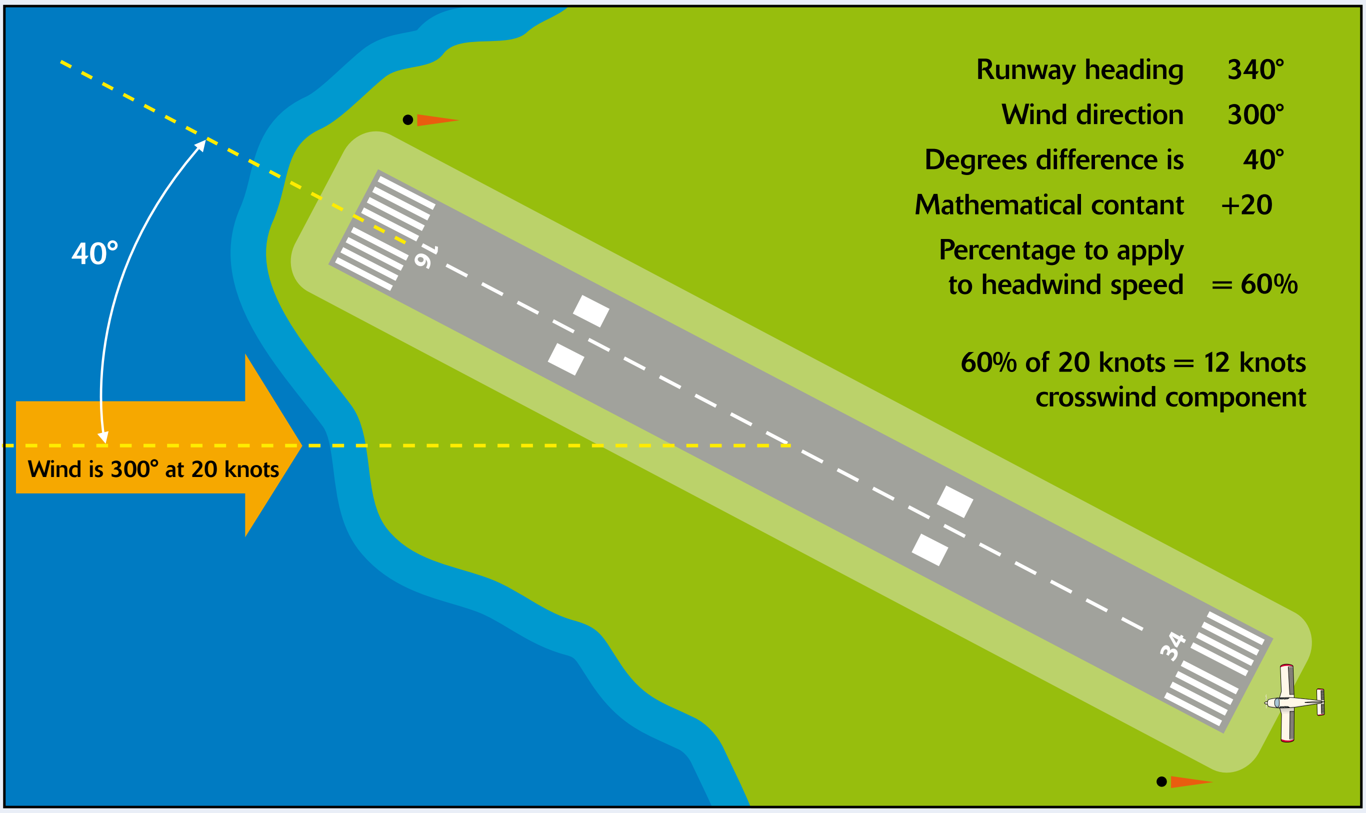
(See diagram below.)

Maximum Demonstrated Crosswind

The "Maximum Demonstrated Crosswind" component, which can be found in an aircraft's flight manual, is the figure at which factory testing has shown that directional control of the aircraft can still be maintained. It is affected by the size of the rudder, its distance from the C of G, and the availability of asymmetric braking.

An aircraft is capable of landing in crosswinds of greater strength than the maximum demonstrated crosswind, provided that the pilot's technique and currency are up to the job. Is your technique up to scratch? If not, grab an instructor and get out practising.

A reminder to instructors who are certifying competency for both PPL issue and Biennial Flight Reviews, that it is a requirement to have crosswind skills demonstrated to you. It is for this reason that a BFR can be conducted over a period of up to 60 days.



Reduce Head Down Time

Controlled flight into terrain on a non-precision approach in instrument metrological conditions (IMC) is more than likely going to be caused by human error. To minimise the risk of such an occurrence, a thorough approach brief should be made. This brief should include how you will join the approach, what speed you will fly the approach, and what type of profile you will fly.

A prudent pilot will look at the Advisory Altitude profile and fly the approach as part of a consistent descent profile. In most cases, this type of profile should deliver you to the missed approach point (MAPt) at the Minimum Descent Altitude (MDA).

"A stable, consistent approach encourages appropriate descent rates and good engine handling. It will be more pleasant for the passengers' comfort, and make it easier to maintain a consistent speed for sequencing by air traffic control – and following the advisories is the safest place to be," says Willie Sage, a flight examiner with Flight Test New Zealand.

When flying in a two-crew environment, the non-flying pilot can read and cross check the aircraft height against the Advisory Altitude profile, and give the flying pilot an indication if the aircraft is high or low on the approach. This is not the case, however, in a single-pilot aircraft. The lone pilot must cross check his or her own profile, with minimal head-down time. Easier said than done.

Here is a tip to help you reduce your head-down time:

A standard descent profile is around five percent. This equates to a descent rate of 300 feet per nautical mile. For example, if the aircraft is on a 3 mile final it should be descending through 900 feet agl.

DME distance	1	2	3	4	5	6	7	8	9	10
Advisory Altitude 5%	300	600	900	1200	1500	1800	2100	2400	2700	3000

It follows, therefore, that at 10 miles on a standard descent profile, an aircraft should be descending through 3000 feet agl. If this is used as a base line average, then a comparison can be made with the approach you are about to fly.

Looking at the VOR/DME RWY 24 approach at Woodbourne. Compare the standard 10 mile altitude of 3000 feet with the 10 mile Advisory Altitude at Woodbourne of 2950 feet. Note the 50 foot difference.

WB DME DIST	MAPt 1.0	1.8	2	3	4	5	6	7	8	9	10
Advisory Altitude 5%	MDA	MDA	550	850	1150	1450	1750	2050	2350	2650	2950

Category	A	B	C	D
VOR/DME	460(380) – 1600		460(380) – 2000	NA
Circling #	520(411) – 1900	610(501) – 2800	1360*(1251) – 3700	

Circling NA in sector 100°-240°
* CAT C circling speed restricted to MAX IAS 160kt

Effective: 15 FEB 07

© Civil Aviation Authority

WOODBOURNE
VOR/DME RWY 24

This 50 foot difference can now be applied to all Advisory Altitudes throughout the approach.

As you fly the approach and reach 6 miles, you should be saying to yourself, "6 times 300 equals 1800, minus 50 equals 1750, so at 6 miles I should be at 1750 feet".

In the Woodbourne example, minus 50 feet was applied. In some cases in New Zealand, the Advisory Altitude can turn out to be 'plus' a certain number of feet against the 'standard profile'.

Although this technique works well for the majority of approaches in New Zealand, there will be airfields around the country that have steeper approaches, or are difficult to calculate, because of the aerodrome elevation.

Whichever technique you use to calculate an approach profile, you must be 100 percent sure that you are higher than any obstacle on approach.

Remember that the Advisory Altitudes are exactly that, advisory. A prudent pilot uses them to reduce their workload. ■

Te Araroa Airstrip – CLOSED!

Despite the Te Araroa airstrip having been closed for several years, it has become apparent that aeroplanes and helicopters are still using it.

The Te Araroa airstrip is no longer published in Vol 4 of the *AIP New Zealand*.

The Gisborne District Council advises that they have not maintained this area of land, and that they will not take responsibility for its upkeep, nor will they accept any liability should an aircraft using this former airstrip have an accident.

The surface is rough and overgrown, and people often use the area for camping.

Pilots are reminded that, "No person may use any place as an aerodrome unless that place is suitable for the purpose of taking off or landing of the aircraft concerned", rule 91.127 *Use of Aerodromes*. Te Araroa is clearly not suitable for the purposes of taking off or landing by any aircraft. Furthermore, without permission of the land title holders, pilots of any aircraft also run the risk of trespass action under civil law. ■

Radio

New Zealand registered aircraft operating within the territorial limits of New Zealand are covered by a General User Radio Licence. This means aircraft are no longer required to hold an individual Aircraft Radio Licence unless they will be operating overseas.

The General User Radio Licence allows a person to operate aeronautical service radio transmitters, for the purpose of:

- The safe and expeditious conduct of civil aviation; or
- An emergency; or
- A matter that relates to the particular occupation, industry or activity in which an aircraft is engaged; or
- Providing telecommunications services to passengers of aircraft.

Aeronautical land-station transmitters, such as an aero club with a ground radio and ATS units, must hold an individual Radio Licence, in order to manage interference.

For further information, or to apply for a Radio Licence, contact the Radio Spectrum Management Unit at the Ministry of Economic Development, www.rsm.govt.nz.

While most aircraft do not require an individual radio licence, anyone using an aircraft radio must be appropriately qualified. The Radiocommunications (Radio) Regulations 1993 require any person operating radio transmitting equipment, either aircraft or ground based, in the frequency range 118.00 to 130.00 MHz to hold an applicable certificate of competency. A pilot licence, flight engineer licence, and ATS licence, are all considered to be appropriate qualifications.

All communication and navigation equipment installed on an aircraft has an 'approval level'. This is a number allocated to a particular item of equipment indicating the capabilities and technical specifications that the item met when the equipment was approved.

Rule 91.513 requires aircraft operating under VFR in controlled airspace to be equipped with level 1 or 2 radio communications equipment capable of continuous two-way communication with an appropriate ATC unit (unless authorised by ATC to operate without radio communication). Aircraft flying VFR in uncontrolled airspace also need level 1 or 2 radio equipment if it is to be used for communication with any ATS Unit.

Rule 91.515 also specifies that aircraft operating VFR over water, more than 30 minutes flying time from the nearest shore, must be equipped with level 1 or 2 communication equipment.

A higher standard is required when operating IFR. All communication equipment must meet level 1 standards.

It is the operator's responsibility to ensure that the equipment on board their aircraft is of the appropriate approval level for the type of operations they are conducting. To enable pilots to determine this, the form CAA 2129 *Aircraft Radio Station Equipment Approval Levels* can be found in the aircraft's flight manual. This lists all the communication and navigation equipment installed in the aircraft and their corresponding approval level. If any of this equipment is changed, then the person authorised to certify the aircraft release to service should complete a new CAA 2129 form.

For further information on approval levels see Advisory Circular AC43-10 *Aircraft Radio Station – Form CAA 2129*. This is available on the CAA web site. ■

Planning an Aviation Event?

If you are planning an event, large or small, such as an airshow, air race, rally, or major competition, the details should be published in an *AIP Supplement* to warn pilots of the activity.

The published cut-off dates for the AIP are listed below, but you must advise the CAA **at least one week** before those dates, to allow for inquiries and processing. Note that, even if you have applied to the CAA for an aviation event authorisation, this does not automatically generate an *AIP Supplement* or airspace request.

Email the CAA, aero@caa.govt.nz. Further information on aviation events is in AC91–1.

Supplement Cycle	***Effective Date***	***Cut-off Date With Graphic***	***Cut-off Date Without Graphic***
07/6	7 Jun 2007	29 Mar 2007	5 Apr 2007
07/7	5 Jul 2007	26 Apr 2007	3 May 2007
07/8	2 Aug 2007	24 May 2007	31 May 2007
07/9	30 Aug 2007	21 Jun 2007	28 Jun 2007

This month the CAA's new surveillance system goes live. Audits will be more consistent, and improvements to the way the CAA assesses safety risk will be introduced.

New CAA Surveillance System

In 2005 the Auditor-General reported that the CAA needed to upgrade its surveillance of aviation operators. The report said the risk assessment system the CAA used to underpin its surveillance of operators was not robust enough. It said the CAA did not always ensure that higher risk operators received the right level of CAA attention.

At the time of the report, the CAA had already begun work on revising the surveillance system it used to assess an operator's safety compliance. The CAA wanted the system to be more efficient and cost effective.

The overarching goal was to provide a consistent and reliable picture of how well each operator complied with the Civil Aviation Rules, and the risk that they might not comply in the future. The CAA needed to calculate what the social cost of this non-compliance might be for the public and the wider aviation community. It was also important that operators were able to see the clear and correct reasoning for what level of risk they were assessed as representing.

"The improved system will give the CAA a depth of understanding of operators' safety performance that is world leading."

– Director Russell Kilvington

Director of Civil Aviation Russell Kilvington said the CAA's improved surveillance system had been developed to achieve those goals.

"The improved system will give the CAA a depth of understanding of operators' safety performance that is world leading.

"Nowhere else in the world has every piece of surveillance intelligence from across an aviation regulatory agency been developed into a single, integrated, semi-automated system," Mr Kilvington said.

The new surveillance system involves philosophical and procedural changes that will affect operators (aviation organisation document holders, such as airlines, smaller air transport operators, flight schools, and maintenance organisations).

Existing Operators

From this month, compliance with rule-based checklists developed at initial certification will help establish new operators' risk profile assessments. Existing operators will have their checklists developed in preparation for their next scheduled audit.

While "risk profiling" had been used for many years by the CAA, the old system was very limited in its scope. The resulting risk profiles were a solid starting point, but the CAA could not have complete confidence in them.

When devising the new system, the CAA recognised that truly effective surveillance should start as soon as an operator entered the aviation system – at certification. When an applicant applied to be a certificated aviation document holder, they would be assessed for their likely future risk to aviation safety.

Under the new system, risk profile assessments are based on about 30 factors that years of experience have shown are significant. These include the level of experience of key staff within the organisation, the kinds of activities it undertakes, and where these activities take place. These factors are tallied at certification to give an operator an initial risk profile score of either **low, medium low, medium high,** or **high**. The system is also able to build risk profiles for individual document holders, such as Part 43 maintenance providers. However, it is expected that only a very limited number of individual document holders will participate in the system.

Auditors Audit

Much of the work CAA auditors used to do, such as gathering background files and operations manuals in preparation for an audit, and checking whether findings have been closed off, will now be done by administrators. Similarly, deciding the audit schedule and the depth of audit each operator is to receive will be done by managers. The aim is to free auditors up to concentrate on auditing each operator to a pre-determined depth that can be transparently justified to everyone involved, and then feeding the results back into the fully automated and integrated CAA-wide surveillance system.

Once the system has been bedded in, the CAA will produce a graph for each group of operators, which shows them where their risk profile sits relative to their peers. Each operator will be able to see only their own score. The remaining scores will not be identified.

An operator's starting point score affects how closely the CAA will monitor the fledgling operation in its first year. At the same time, to help new operators be absolutely sure of what is expected of them, the CAA has also upgraded its certification procedures.

New rule-compliance checklists are tailored during certification.

When a new operator applies to join the aviation system, checklists are drawn up itemising every rule the company will be required to comply with. The checklists are tailored to each operator; they are not simply pointers to the overall rule Parts in question, but detailed lists of the hundreds of rules that apply to each operator.

At each new operator's first scheduled audit after they begin operating, 100 percent of the items on their certification checklists will be audited. The results of that audit are fed into the operator's risk profile. An operator whose resulting risk profile is low can anticipate a lower level of future surveillance than an operator with a higher risk profile.

As well as ensuring new operators know precisely what is expected of them, the certification checklists increase CAA efficiency and transparency. Every operator doing the same job must comply with the same checklists. If there are any differences, these must be justified and noted. There is also no reliance on particular staff members' experience and knowledge. Each auditor must tick off the checklists in the same way, and carry out the audit to the same level of thoroughness. Along the way, any variance must be documented. The entire process is done electronically on a tablet PC and uploaded onto the CAA's database when the auditor returns to the office.

Audit results are not the only factor in forming a risk profile.

Audit results are just one factor influencing an operator's risk profile. Every technical specialist throughout the organisation is now able to update an operator's risk profile electronically, based on information they receive. One example might be if a senior person within an organisation resigns. When a CAA staff member notes that information onto the CAA database, they will be prompted to decide if the change will affect the operator's risk profile. A series of word pictures have been developed to help staff make that determination. Any changes are electronically documented showing who made the change, and what it was. In addition to this, an automatic process evaluates up to 15 parameters every night, which may result in a change to an operator's risk profile.

Profile Queries

The new surveillance system allows operators to see what parts of their business increase their risk profile. Operators requiring further clarification of their risk profile should speak directly with the appropriate CAA manager.

Alert tolerances are set throughout the system so that if an operator exceeds a tolerance on any given aspect of their operation, the appropriate CAA line manager will receive an alert on their computer, which will require either an action, or a determination that no action is necessary (again, each decision is automatically documented).

Similarly, operators can see precisely what parts of their business increase their level of risk, and thus attract additional CAA attention. Safer, low-risk operators can be rewarded with less CAA intervention, without compromising the safety of the New Zealand public and the aviation community. ■

New Charts

It's time to order your 2007 series of Visual Navigation Charts

Series	Scale	
A	1:1 000 000	A1 and A2 – VPCs to be used for planning purposes and for flight above 10,000 ft
B	1:500 000	B1 to B6 – VNCs covering the whole country, and most suited for cross-country navigation (less airspace information than the 1:250 000 scale).
C	1:250 000	C1 to C14 – VNCs covering the whole country, and most suited to low level and local navigation.
D	1:125 000	D1 and D2 – New scale charts. D1 Auckland Terminal, and D2 Christchurch Terminal, VNCs depicting a larger scale of the Auckland and Christchurch airspace.

The next series of Visual Navigation Charts (VNCs) and Visual Planning Charts (VPCs) are in the final stages of production and will be mailed out to users in early May, with an effective date of 7 June 2007. If you have not already placed an order for the 2007 series of charts, you can do so by visiting the Airways web site, www.aipshop.co.nz, or call toll-free on 0800 500 045.

There have been a number of changes to the current series of charts. The most noticeable are:

- ***Chart backing*** – No longer will you flip your chart over to discover the chart on the back is a different scale. Each scale series will be stand-alone with a clear colour-coded band on the front panel of each series. In order to achieve this, the chart numbering has been rationalised to reflect the different scales. The names of the charts have not changed.
- ***Airspace*** – Queenstown and Manawatu regions have had significant airspace changes. These will be explained in detail in the May/June 2007 issue of *Vector*.

  There have been several minor airspace changes in other regions which are being phased in between 15 February and 7 June. For an understanding of airspace and other changes, please refer to your latest *AIP Supplement*, or you can view the *Supplement* online, www.aip.net.nz. The *AIP Supplement* effective 10 May 07 will contain a complete publication of all the 7 June 2007 airspace changes.
- VFR Special Procedures Areas (SPA) have been renamed Common Frequency Zones (CFZ). There are no procedure or frequency changes associated with this change. ■

Weather Encounter Study

General Aviation pilots are urgently needed to participate in a study of the human factors of flights, into or near, adverse weather. This internet-based study is designed to improve our understanding of the events and circumstances surrounding such flights.

If you have been on a flight during which you ran into potentially hazardous weather conditions, or during which you successfully managed to avoid such conditions, we want to learn from your experiences.

This is an international study, which the researchers believe will provide valuable insights into the causes of weather-related accidents – the single largest cause of fatal accidents in the general aviation sector. The study is being conducted by leading aviation human factors researchers from around the world. New Zealand is one of four countries that has been selected to participate.

The anonymous questionnaire, which is being conducted over the internet, can be found at **www.avhf.com**.

Further information about the study can be obtained from the New Zealand coordinator for the study, Dr. David O'Hare, at safety@otago.ac.nz. ■

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Back to Basics

Technology, Tips and Traps

Technology can be a wonderful tool. Innovations available to pilots today can provide large amounts of information, making flying more efficient and arguably safer. There are some pitfalls, however, if technology is not used appropriately, or if it fails, or distracts pilots from other basic tasks.

The theme of the CAA 2007 series of AvKiwi Safety Seminars is "Back to Basics", with an emphasis on the tips and traps in using new technology.

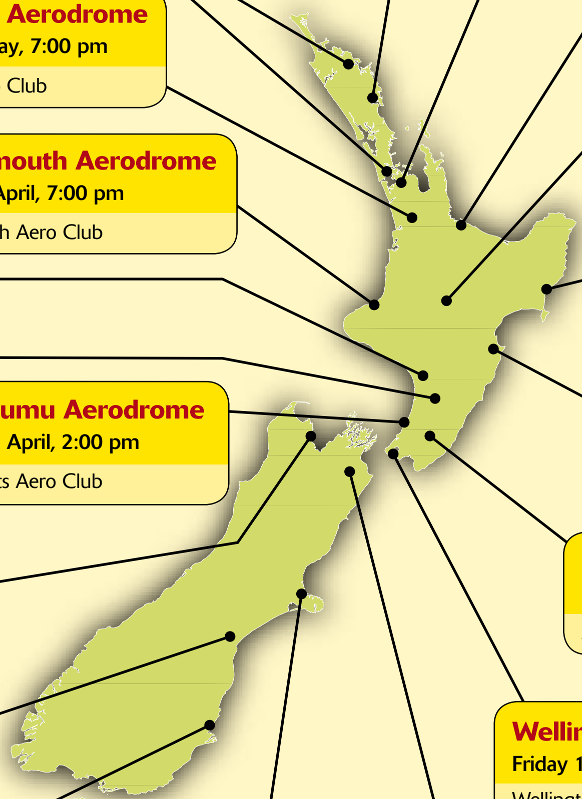
Topics covered will include:

- Lookout
- Route planning
- Communications.

The series of seminars will be presented by Dave Horsburgh, a pilot with more than 20,000 hours flying experience. Dave is an airline A320 captain, A-Cat Instructor, Flight Testing Officer, GA and Airline Examiner, and the Aircraft Owners and Pilots Association (AOPA) Safety Officer.

Seminar Schedule

(duration approximately 2 hours)



Kerikeri Aerodrome
Tuesday 29 May, 7:00 pm
Bay of Islands Aero Club

Ardmore Aerodrome
Saturday 26 May, 3:00 pm
Auckland Aero Club

Whangarei Aerodrome
Monday 28 May, 7:00 pm
Northland Districts Aero Club

North Shore Aerodrome
Sunday 27 May, 10:30 am
North Shore Aero Club

Tauranga Aerodrome
Friday 27 April, 7:00 pm
Tauranga Aero Club

Hamilton Aerodrome
Friday 25 May, 7:00 pm
Waikato Aero Club

Taupo
Thursday 26 April, 7:00 pm
Lakeland Resort, 282 Lake Terrace (Two Mile Bay), Taupo

New Plymouth Aerodrome
Tuesday 17 April, 7:00 pm
New Plymouth Aero Club

Feilding Aerodrome
Sunday 15 April, 2:00 pm
Flight Training Manawatu

Gisborne Aerodrome
Saturday 28 April, 7:00 pm
Gisborne Aero Club

Palmerston North
Monday 16 April, 10:00 am
Massey University Campus, Japanese Lecture Theatre (opposite commercial complex)

Paraparaumu Aerodrome
Saturday 14 April, 2:00 pm
Kapiti Districts Aero Club

Bridge Pa Aerodrome (Hastings)
Sunday 29 April, 7:00 pm
Hawkes Bay & East Coast Aero Club

Motueka Aerodrome
Friday 18 May, 1:00 pm
Nelson Aviation College

Hood Aerodrome (Masterton)
Monday 30 April, 7:00 pm
ATC Building

Timaru Aerodrome
Tuesday 15 May, 7:00 pm
South Canterbury Aero Club

Wellington Airport
Friday 13 April, 7:00 pm
Wellington Aero Club

Dunedin
Monday 14 May, 7:00 pm
Cargills Hotel, 678 George Street, Dunedin

Christchurch Airport
Wednesday 16 May, 7:00 pm
Canterbury Aero Club

Omaka Aerodrome
Thursday 17 May, 7:00 pm
Marlborough Aero Club

More **South Island** seminars will be scheduled for June. A complete list of seminars will be on the CAA web site, www.caa.govt.nz, see "Safety information – Seminars", and published in the next issue of *Vector*.

LOSA

Line Operations Safety Audit in New Zealand

This is the second of two articles on LOSA. The first, published in the November/December 2005 issue of *Vector*, introduced the concept, and this one describes the experiences of Air New Zealand and Airways New Zealand. Airways? Yes, the concept, with suitable modification, works as effectively on the ground as it does in the air.

LOSA is a proactive 'health check', rather than the 'post-mortem' of an incident or accident investigation. It assesses the system rather than crews, and highlights system safety and crew performance strengths and weaknesses. Since 1996, over 6000 LOSA observations have been made worldwide, involving 29 airlines from 15 different countries.

The aim is to observe crews in a normal operating environment, with no feeling on their part that they are 'on check'.

In adopting LOSA, business case and financial considerations aside, the main items are: the scope of the audit (what to look at and how many observations), scheduling of observer training and the actual audit, data cleaning and analysis, and feedback to the system and the participants (the line pilots). Out of the analysis and feedback come the changes to policies and procedures that result in improved system safety.

Observer training follows a standard format. A number of observers are selected from within the airline, usually with the assistance of a representative from The LOSA Collaborative (TLC). TLC is a user network of researchers, safety professionals, pilots and airline representatives, and is formally linked to the University of Texas (UT) Human Factors Project, providing oversight, an information exchange forum, benchmarking, and continuing development of threat and error management (TEM).

For new observers, two days are spent in 'ground school', two days on practice observations, and a further day on 'observer calibration', or standardisation. Observations are of a 'fly on the wall' nature, with no interaction between the observer and crew. Critical factors in the observations are de-identification of the data, and a no-jeopardy approach, so that crews cannot be disciplined as a result of any observation. The aim is to observe crews in a normal operating environment, with no feeling on their part that they are 'on check'.

LOSA has been enthusiastically adopted in New Zealand, with several operators having performed a LOSA, and with more in the planning stages.

Air New Zealand

In 1998, Air New Zealand, in conjunction with the UT, conducted a LOSA in which three UT observers and three Air New Zealand pilots completed systematic observations of 91 flight segments. Observations focused on normal events that occur during flight (now called threats, in line with the TEM concept), crew resource management (CRM), and technical skill level in dealing with those threats. If a threat went unchecked, it was classified as developing into an error and again comment was made on CRM and the way the crews dealt with those errors. Crew were also quizzed on their perceptions on safety and what they thought could be done to improve the airline safety system. This was all done by Air New Zealand to improve safety within the organisation and develop a healthy safety culture. As a result of this LOSA, Air New Zealand identified numerous issues and, in conjunction with a variety of groups, several recommendations for improvement were put forward.

A second LOSA was carried out in 2003, over all fleets except the A320, which was not yet in service. Data was collected

from observations on 200 sectors, and to date, only two or three minor issues generated from that LOSA remain to be addressed. According to First Officer Paul Clayton, LOSA Manager since January this year, the concept of LOSA has been enthusiastically embraced by the whole airline, including flight crew, other major stakeholders, and industrial groups. All are pleased with the result, and happy with the recommendations put forward. A marked culture change is evident since that first LOSA nine years ago, which is an encouraging sign, especially with the introduction of new procedures and technology posing potential threats. The threat and error management (TEM) culture developed through LOSA is "alive and well," says Paul.

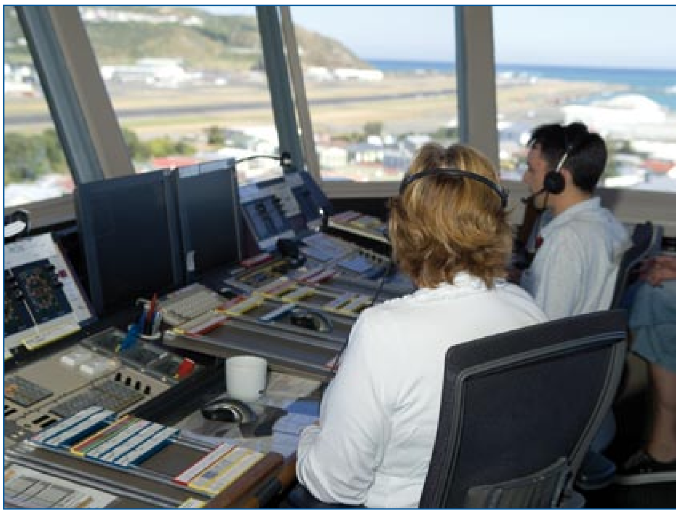
Another LOSA is planned for June this year, in which 290 observations are planned over all five fleets (Boeing 737, 747, 767, 777, Airbus A320). This requires a total of 20 observers, including three from TLC. Internal applications were called for the remaining 17 positions, with 36 staff having expressed interest by the closing date.

Air New Zealand has integrated LOSA as an important tool into its Safety Management System (SMS), along with other SMS tools such as reporting (both open and confidential), data analysis, and incident investigation. Carrying out LOSAs on a regular basis provides a safety health check on any airline. Air New Zealand sees the potential of LOSA not only as improving the safety of operations, but also as a regulatory tool, which in the long term may reduce route audit frequency, and therefore cost. There is also potential for a similar concept to be extended into areas such as engineering and ramp operations to name but two.

NOSS – LOSA for Air Traffic Control

Normal Operations Safety Survey, or NOSS, is an adaptation of LOSA specifically for Air Traffic Control. The underlying principles are the same, but the practice has been modified for the different environment.

In June 2005, Airways New Zealand, in conjunction with ICAO and the UT, participated in a trial NOSS. This was one of three trials conducted, the other agencies being Airservices Australia and Nav Canada. The key prerequisites of management, staff, and union buy-in were achieved without difficulty. The survey target was set at 60 observations spread over the Christchurch Radar Centre and three International Towers.



Out of the pool of potential observer candidates, four radar observers (plus the project officer, Paul Fallow) and two tower observers were selected and trained for the role. One observer was a union council member, which helped ensure a high level of transparency in the process for staff. The first practice observations were an 'eye-opener' for the observers, both in the volume of data (threats, errors, and undesired states they observed) and the time it took to write up the observations.

The trial NOSS took two and a half weeks, and completed 63 observations. The willingness of staff to participate was very encouraging, and the genuine interest shown by most had an unusual side effect, in that it was difficult at times for the observers to maintain their 'fly on the wall' status in quieter periods and avoid conversation with those being observed. Overall, the observers handled these situations very well by pushing back from the operating positions, thus maintaining the integrity of the process.

The results of the trial NOSS were presented to Airways at the end of August 2005 by the UT. From the report, 11 recommendations for operational improvement have been identified and accepted. In addition to these, NOSS data has been used to provide factual support for a decision to review the operational complexities of the Bay (of Plenty) Sector. This review has resulted in a number of changes being implemented to support staff at the 'coal face'. A further, more intense, NOSS will take place later this year, although the time frame has yet to be established. This NOSS will focus on the terminal sectors, evaluating strengths and weaknesses of each mode of operation. It is hoped that the information gained will allow a plan for greater consistency and improved safety levels between the sectors to be developed.

A forum to exchange data from NOSS with LOSA airlines is also on the agenda, as pilot/controller interaction generates a high number of threats and errors. A mutual understanding of the consequences of these interactions will go a long way towards the development of meaningful and practical improvements.

Other Activity

Mount Cook Airline occupies a unique position in the history of LOSA, being the first regional airline in the world to conduct a LOSA. This was in June 2004, and a second is planned for later this year. A marked culture change is already evident, along with several operational improvements.

At last report, Air Nelson is waiting until the changeover of the fleet from the Saab 340 to the Bombardier Q300 is finished, before looking at LOSA.

JetConnect also has a second LOSA scheduled in 2007; their LOSAs are carried out under the support of the parent airline, QANTAS.

Air Freight New Zealand Ltd completed a 60-sector LOSA in November 2006, with the formal report still in preparation by TLC.

CAA

To say that CAA's General Manager Airline Group, Tim Allen, is an enthusiastic supporter of LOSA would be an understatement. Tim says, "New Zealand is in a unique position with LOSA well established throughout the aviation system. The CAA strongly supports the continued use of LOSA as a major tool assisting in improving flight safety." ■

Calling All Aircraft Operators

Maintenance Rules Change

There are fundamental changes to maintenance requirements from 1 March 2007. These changes affect every aircraft operator and maintainer. The CAA has been holding seminars around the country to provide a brief on the changes and answer questions.

We can only provide a brief overview of the major changes here – it is your responsibility to keep up-to-date with rule changes, and these are freely available on the CAA web site. There is also advisory information from the seminars on the web site, see "Index – Maintenance Rules Changes".

There are two draft Advisory Circulars (ACs) on the CAA web site relating to the rule changes:

AC91-'XX' *Piston engine TBO escalation procedures*

AC91-'YY' *Light aircraft maintenance programme - aeroplanes*

Talk with your maintainer about all the requirements of the maintenance programme/schedules, for example special inspections, aging aircraft programmes, and escalations for piston engine aeroplanes (refer to AC91-XX).

Here are some notes on the major changes:

Maintenance Programmes

The amended rules require every operator/owner to have a maintenance programme for their aircraft.

Previously, most aircraft that were not on air transport operations were required to use Part 43 Appendix C as their maintenance schedule, or have a programme of their own approved by the CAA.

Now all aircraft must be maintained to one of the following options:

- The manufacturer's schedule (the default programme for most operators).
- A programme approved under rule 91.607 (if you want to vary the manufacturer's requirements).
- An acceptable programme (see AC91-YY). Note that this is for aeroplanes only – piston engine and below 2730 kg.
- A programme approved under Part 119 if they are on air transport operations (no change).

All of these programmes must adopt the requirements of the manufacturer's schedules which will include such things as:

- Special inspections, eg, hoses, engine mounts, control cables, trim jacks, etc.
- Aging aircraft programmes, eg, Cessna SIDS and CAPS.
- Calendar inspections.

There is a transition period for operators to comply with these requirements.

Escalations of Engines

The term 'on condition' has gone. To operate beyond a manufacturer's TBO an escalation procedure will have to be in place. Part 91 operations, piston engine aircraft (non hire or reward) must be maintained to a programme acceptable to the Director.

For Part 91 piston engine aircraft (hire or reward) and air operations, the escalation procedure must be included in either a rule 91.607 approved programme, or their Part 119 approved programme. The TBO for these operations will be to a fixed period.

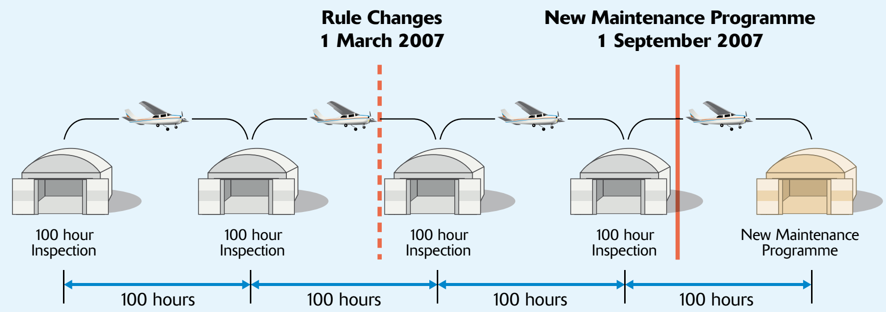
AC91-XX will provide guidance material.

There is a transition period for operators to comply with these requirements.

Transition Period - High Utilisation Aircraft

Part 91 Appendix B (a) (2) (i)

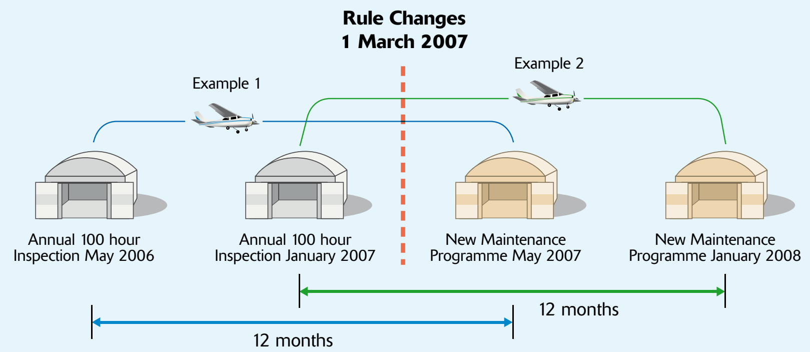
For example, flight training, agricultural, parachuting, etc.



Transition Period - Low Utilisation Aircraft

Part 91 Appendix B (a) (2) (ii)

Less than 100 hours per year, ie, most private aircraft



Annual Reviews of Airworthiness

There is now provision for a planning latitude of 36 days that can be applied by the operator to allow for maintenance scheduling. This is provided all other aspects of maintenance are within their due date or their own latitude period.

Beyond the latitude period, you can still fly for the sole purpose of getting your aircraft to a location where an ARA can be done.

There are changes to the ARA requirements. An ARA can no longer be certified with defects.

If the IA finds a defect, it must be fixed prior to flight. If it takes longer than 30 days to fix all of the defects, the IA is required to complete a new ARA.

All ARA returns must now go to the CAA.

Part 43 Appendix A Maintenance

The privilege to perform what was known as pilot maintenance has been expanded to include unrated LAMEs. There is a split in privileges between certificated operators and non-certificated (Part 91) operators. The two sets of privileges are now called Appendix A1 and Appendix A2.

A1 – Base privileges for all.

A2 – Additional privileges for non-certificated operators.

There are some additions to the list of maintenance that can be performed. They include oil changes and spark plug changes. These tasks still require training by a LAME and documentation to support this. The written authorisation of owner/operator is also still required.

Additional Changes

- All aircraft certificated with four or more seats are now required to be weighed at least every 10 years.
- Carbon monoxide detectors are to be fitted to aircraft with exhaust muffler heating or combustion heaters. These must be fitted by 1 June 2007.
- Inspections such as compass swing, first aid kit, etc, have now moved from an AC into the rules.
- Microlights with transponders now require the same transponder check as other aircraft.
- You must not carry maintenance logbooks in the aircraft.

- There is new wording for the statements referring to release to service.
- There is a new requirement that the person performing a duplicate inspection must be an aviation document holder.
- There is a new requirement to certify a release to service for inoperative equipment.

Part 119 Changes

Operators certificated under Part 119/135 should review their exposition and maintenance programmes for the required procedures relevant to their operation. For example, expositions must include the aircraft type and serial number in addition to the registration mark. Also required are induction procedures, options for maintenance, condition monitored maintenance, maintenance review, etc. Also check rule number references, and references to changed requirements such as release to service, duplicates, etc (some of these have no transition provision).

There is a transition period for operators to make these changes.

There are also changes to the operating rules, Parts 121, 125, and 135.

Conclusion

This is just a brief overview of the changes to maintenance rules effective 1 March 2007. Aircraft operators need to be aware of the changes, as they are directly affected by them. The web page will help you with this, as there are links to the rules, as well as information from the seminars. ■

New Products

How to Be a Pilot

The *How to Be a Pilot* booklet has been revised and updated. This explains the process of gaining a pilot licence in New Zealand.

To obtain copies of this booklet, contact either your local Field Safety Adviser (see the advertisement in *Vector* for their contact details) or email: info@caa.govt.nz.

Unmanned Aerial Vehicles

The remote control of small aircraft, usually in the form of models, has been available to enthusiasts since the early 1960s. Early radio control systems used valve technology and the equipment, including the airborne pack, was huge compared to modern miniature equipment. Not only was size and weight a problem, but initially models could only be controlled with limited rudder deflections. Neutral, full left and full right were the only rudder positions possible. Even with this basic control system, pilots of early radio controlled aircraft could perform skilled aerobatic manoeuvres and achieve very accurate flights. However, as those involved at the time will recall, the reliability ratio between successful and unsuccessful flights was not great.

The desire for reliability and better performance quickly led to the development of proportional systems that allowed model aircraft to be flown from a transmitter that featured joy stick controls similar to full size aircraft.

The development of highly reliable modern proportional radio control systems has resulted in small and lightweight airborne equipment that permits the operation of either very small aircraft (so small that some can be flown indoors) or larger aircraft with considerable payload capabilities.

The opportunity for a radio controlled model aircraft to carry a payload creates a number of possibilities. The model then becomes a realistic aerial platform for cameras, sensors, and other scientific equipment. Early proportional radio control equipment also played a part in the development of the space shuttle.

Over recent years the technology has developed further and now fully autonomous flight is a reality. The Unmanned Aerial Vehicle (UAV) category of aircraft now fly on various operations in a number of countries. Although current UAV operations mostly relate to the military or research sectors, it is clear that there are many civil roles that these aircraft could undertake. Roles like coastal patrol, boarder control, fisheries, traffic and police duties, agricultural work, power line survey work, aerial photography, and filming of major events, have all been suggested as possibilities for the future.

Although the UAV has its developmental background in the model aircraft sector, it is now clear that UAVs have become a category of aircraft in their own right. Unlike model aircraft that operate under Civil Aviation Rule Part 101 for the purpose of providing education and recreation for the builder/pilot, the UAV is a commercial activity, be it for research or on a specific mission.

The demarcation between UAVs and model aircraft is just one of many significant issues identified at the inaugural UAV Seminar conducted by the CAA in late 2006. This seminar was attended by representatives from the military, research and development organisations, current aircraft operators, potential UAV operators, the New Zealand Model Aeronautical Association, and other invited interested parties.

Other issues identified at the seminar include: operator and pilot qualifications, maintenance, airworthiness, operator certification, airspace (both controlled and uncontrolled), and reliability. A copy of the UAV issue paper is on the CAA web site, www.caa.govt.nz.

Rule 19.105 *Pilotless Aircraft* states that, "No person shall operate a pilotless aircraft except with the authorisation in writing of the Director and in accordance with such conditions as may be specified in the authorisation." The CAA will review the appropriateness of this rule after analysing the issues raised at the UAV seminar and in the UAV issue paper. The outcome of this review may lead to new rule-making or the provision of guidance material in the form of an advisory circular.

The solutions to regulatory issues concerning UAVs will most likely be provided by overseas authorities and, in time, be adopted by the International Civil Aviation Organisation (ICAO).

The CAA recognises the research under way in New Zealand regarding UAVs, and it is possible that high technology solutions could be developed here.

The CAA contact regarding UAVs is Rex Kenny, Manager Sport and Recreation, email: kennyr@caa.govt.nz. ■

STOP PRESS

ELT Survey

The New Zealand SAR Council, in association with Colmar Brunton, are conducting a survey on ELT beacons.

If you would like to participate in this important survey, please go to this web site:

http://survey.cbrak.co.nz/NZSAR1

How to Get Aviation Publications

Rules, Advisory Circulars (ACs), Airworthiness Directives

All these are available for free from the CAA web site, www.caa.govt.nz. Printed copies can be purchased from 0800 GET RULES (0800 438 785).

AIP New Zealand

AIP New Zealand Vols 1 to 4 are available free on the internet, www.aip.net.nz. Printed copies of Vols 1 to 4 and all **aeronautical charts** can be purchased from Aeronautical Information Management (a division of Airways New Zealand) on 0800 500 045, or their web site, www.aipshop.co.nz.

Pilot and Aircraft Logbooks

These can be obtained from your training organisation, or 0800 GET RULES (0800 438 785).

Liquids, Aerosols, and Gels

On 31 March 2007, additional security screening measures are being introduced on all international flights leaving New Zealand. Any liquids, aerosols, and gels that passengers want to take in their carry-on baggage will have to comply with the following requirements.

All liquids, aerosols and gels must be in containers of 100 ml volume or less. Containers larger than 100 ml will not be permitted in carry-on baggage, even if there is only 100 ml of liquid or gel in the larger container.

Passengers may carry as many 100 ml containers as will fit comfortably in a single re-sealable transparent plastic bag of 1 litre volume (approximately 20 cm by 20 cm).

Each passenger, including children, will be allowed to carry on one, 1 litre volume, transparent plastic bag. The plastic bag must be presented separately from all other carry-on baggage at the screening point.

These measures will include, but are not limited, to:

- water and other drinks, soups, syrups, jams, stews, sauces and pastes
- foods in sauce or containing a high liquid content
- creams – including face creams, foundation, sunblock, and insect repellent
- perfumes
- roll-on deodorants
- sprays – including antiperspirant and hair sprays
- gels – including hair, shaving, and shower gels
- pressurised containers – including shaving foam
- pastes – including toothpastes
- waxy substances – including hair wax
- mascara and liquid eyeliner
- liquid solid mixtures – including lipsticks, face compacts, and blushers
- lip gloss and lip balm.

Essentially anything that you can pour, spray, or smear is covered by these requirements.

There are exceptions for medicines, baby products, and dietary requirements. If you require prescription or non-prescription medicine in the form of a liquid, aerosol or gel, you can take these items onboard with you in quantities over 100 ml. These items, however, can only be taken in quantities that are reasonable for the length of your flight, as well as possible delays and flight diversions. Exceptions will also be made for baby food, formula, and other essential baby products. You will also be able to take on board any essential dietary supplements or foods you may require.

Any essential medications, baby products and dietary requirements will be subject to additional checks at the security screening point. For detailed information on exceptions check the Flysmart web site, www.flysmart.govt.nz, or ask your airline.

These increased security measures have been adopted in response to an International Civil Aviation Organisation recommendation that all countries limit the quantity of liquids, aerosols, and gels carried on board international flights. Australia recently decided to implement the measures for all departing and arriving international flights from 31 March 2007. New Zealand has decided to apply them to all departing international flights from the same date.

The security requirements for carrying liquids, aerosols, and gels vary from country to country and may change over time. Before you travel it is important that you check the web site www.flysmart.govt.nz and ask your airline to ensure that you have the correct information. ■

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)

The Civil Aviation Act (1990) requires notification "as soon as practicable".

Aviation Safety & Security Concerns

Available office hours (voicemail after hours).

0508 4 SAFETY
(0508 472 338)

info@caa.govt.nz

For all aviation-related safety and security concerns

Young Eagles News

Pickard Memorial Trophy

Four of the six 2007 scholarship winners competed for the Pickard Memorial Trophy at the RNZAC National Championships held at New Plymouth 15 to 17 February 2007.

Andrew Stewart (South Canterbury), Leigh Cresswell (New Plymouth), Kevin Weller (Tauranga), and Carlton Boyce (Southland) spent a day increasing their aviation knowledge with Young Eagles Coordinator, Robert Orr. In the afternoon they sat an aviation questionnaire and a general knowledge questionnaire to determine the trophy winner. Once the tests were over the Young Eagles enjoyed a flight over the Taranaki region.

The Young Eagles were formally presented with their scholarships at the awards dinner and Andrew Stewart was announced as the winner of the Pickard Memorial Trophy. Andrew joined his South Canterbury Aero Club teammates in dressing as pirates for the evening.

Andrew Stewart, 2007 winner of the Pickard Memorial Trophy.

(Left to right) Andrew Stewart, Leigh Cresswell, Kevin Weller, and Carlton Boyce, listen to Robert Orr talk about ailerons.

Success for Scholarship Winner

21 November 2006 was an extra special day for Scott Hantz. The 2006 Young Eagles scholarship winner, went solo on his sixteenth birthday. Scott had some previous gliding experience, and was ready for the big event after seven hours of training in a powered aeroplane at the Marlborough Aero Club.

Scott says that his first solo was the best experience he has ever had, "I felt so free but I noticed that because the instructor was not in the aircraft, it climbed a lot quicker and was more manoeuvrable. The down-side to this was that in being lighter it took longer for the plane to descend and floated just above the ground longer before I could flare into a nice landing. In the end I did a perfect landing and all went well.

"Since my first solo, I have done three and a half hours solo, and have never looked back. Flying is me and I am flying. I am now learning overhead re-joins – it's not too hard, but it's great fun. I am also just starting my Private Pilot Licence exams and the study that comes with them."

Scott says that he would be happy with a Private Pilot Licence but wants to aim higher, "My plans for the future are to become an international pilot for Air New Zealand or Qantas." ■

Photo Marlborough Express

Scott Hantz.

CAA Hosts Scientific Workshop

Photo courtesy Dominion Post

The Civil Aviation Authority is hosting the 4th International Workshop on Volcanic Ash in Rotorua during the last week of March 2007. Peter Lechner is the CAA's Meteorological Authority Manager, and in 2005 he accepted the challenge to host the meeting.

"It seemed a particularly appropriate venue with New Zealand's position on the Pacific Ring of Fire," he says.

There are procedures in aviation for the mitigation of risk from volcanic ash. The purpose of the workshop is to ensure that scientific advances in the field are fed into improvements in the aviation system.

The meeting is being convened under the auspices of the United Nations World Meteorological Organization (WMO), and is held every three years or so. Previous meetings have been held in Japan, France, and Australia. The local logistics for the workshop are being organised by Keith Mackersy of the CAA. The scientific programme is being arranged by Andrew Tupper of the Australian Bureau of Meteorology, a co-sponsor of the event along with MetService here in New Zealand, and the International Civil Aviation Organisation (ICAO). The meeting will be opened by Harry Duynhoven, Minister for Transport Safety.

Those invited to the Rotorua meeting from around the globe include meteorologists and scientists from all of the ICAO Volcanic Ash Advisory Centres (VAACs): Argentina, Australia, Canada, France, Japan, New Zealand, the United States, and the United Kingdom. There are also representatives from aviation regulatory authorities, airlines, international organisations, and the scientific community.

"Scientific advances developed in conjunction with these meetings are woven into the fabric of the operational systems developed and maintained by the ICAO International Airways Volcano Watch Operations Group," says Peter Lechner, who is Chairman of this Group.

"It's a true international collaboration. The relationship between the WMO and ICAO through these two working groups is pivotal in reducing volcanic ash risk in aviation," he says.

This 4th Workshop will be looking at:

- Forecasting and detecting volcanic eruptions
- Detection and tracking of ash cloud
- Ash dispersion modelling
- Ash cloud boundary definition methodologies
- VAAC and geosciences information co-ordination and communication
- Eruption Source Parameter development
- Eruption data set development, compilation and use
- Infrasound developments
- Radioactive material
- Chemical and toxic material
- Scientific component of warning methodologies
- Training

A key player in the field here in New Zealand is the Institute of Geological and Nuclear Sciences (GNS) who will be adding the local scientific flavour to the workshop. GNS is a key part of the New Zealand Volcanic Ash Advisory System (VAAS), providing the very important ground-based monitoring of our volcanoes.

"It's a good time to remind pilots to brush up on the procedures for making special air reports on any volcanic ash or other volcanic activity they may see – it may save lives," says Peter Lechner.

You can see information about this on the CAA web site, "Airspace – Volcanic Ash Advisory System". Information about the Workshop, including Papers, is also there, "Airspace – 4th International Workshop on Volcanic Ash". ■

Field Safety Advisers

Don Waters
North Island, north of a line, and including,
New Plymouth-Taupo-East Cape
Mobile: 027–485 2096
Email: watersd@caa.govt.nz

Ross St George
North Island, south of a line
New Plymouth–Taupo–East Cape
Tel: 0–6–353 7443
Fax: 0–6–353 3374
Mobile: 027–485 2097
Email: stgeorger@caa.govt.nz

Murray Fowler
South Island
Tel: 0–3–349 8687
Fax: 0–3–349 5851
Mobile: 027–485 2098
Email: fowlerm@caa.govt.nz

Owen Walker
Maintenance, North Island
Tel: 0–7–866 0236
Fax: 0–7–866 0235
Mobile: 027–244 1425
Email: walkero@caa.govt.nz

Bob Jelley
Maintenance, South Island
Tel: 0–3–322 6388
Fax: 0–3–322 6379
Mobile: 027–285 2022
Email: jelleyb@caa.govt.nz

PMA Parts

In the last issue of *Vector*, we discussed the acceptability of replacement parts, and emphasised the importance of having the proper documentation. At the beginning of the article, there was an example of an incorrectly documented part. The comment that "the part was genuine" was not correct – the part is still regarded as a 'suspected unapproved part', and remains ineligible for installation on a New Zealand registered helicopter until it can be proved otherwise. It was a 'PMA' part, a category that is becoming increasingly prominent in the parts supply industry.

Often you will see parts with the legend "FAA-PMA" on the outer packaging. This indicates that the parts have been manufactured by a company that is not the original equipment manufacturer (OEM) – in most cases, anyway, although the exceptions are not discussed here. PMA stands for Parts Manufacturer Approval, which is issued by the FAA (Federal Aviation Administration) under stringent requirements.

PMA parts had their origins in the years following World War 2, when parts for surplus military aircraft started to become scarce. A number of manufacturers set about producing parts to satisfy demand, and even though these parts were not, strictly speaking, the genuine article, they were often produced to the original manufacturer's design specifications. The original military contracts and associated data were by then a matter of public record and thus readily obtainable.

Nowadays, PMA parts fall into two main categories:

- Those produced under licensing agreements with the OEM, using OEM data. These parts generally carry the same part number as OEM parts, sometimes with a prefix or suffix to indicate who manufactured them, and can be considered one and the same for practical purposes.
- Those produced in direct competition with OEM parts. It would be very unlikely that a licensing agreement would exist, and thus the parts would not necessarily carry OEM part numbers.

A manufacturer who wishes to produce parts without access to the OEM data must prove to the FAA by tests and computation that the proposed item meets or exceeds the requirements of the intended application, before being issued with a PMA for that item.

Note that PMA parts may be produced as a modification to the original product – such parts will normally be produced under a Supplemental Type Certificate (STC), which will have its own set of specifications and airworthiness limitations. You may find that modification parts are produced by the OEM under a PMA.

The major driving force for the production of PMA parts is price. Typically, when an OEM is the sole source of replacement parts, that OEM controls the price, and undoubtedly does so to its own financial advantage. PMA parts are often preferred because they can be cheaper than OEM parts. Sometimes an OEM may drop its prices as a result of the competition.

The production of PMA parts is a growth industry, as indicated by the lists on the FAA web site. The total number of items manufactured under PMA, up to the end of 1999, was 142,775. During the years 2000 to 2004 inclusive, another 143,970 items were added, and in 2005 and 2006, a further 163,793 items appeared on the list.

Applicability to Aircraft Type

A Parts Manufacturer Approval is given for a particular replacement part applicable to a particular type-certificated product (an aircraft, engine, or propeller). Sometimes you may find that a PMA part that is one component of a larger assembly on an aircraft will be approved only for use on that aircraft type, even though you know the same assembly is used on other types. You may use that part only on the types specified in the approval.

The test of applicability or eligibility of a PMA part is the FAA-PMA Supplement issued to the manufacturer. The Supplement lists the part number for which the PMA part is an approved replacement, the approval basis and approved design data, and the specific make and model of the product on which the part may be installed.

The lists of PMA parts, their applicability and related Supplement numbers are available on the FAA web site, www.faa.gov, but a word of caution – the resulting Microsoft Access worksheets are enormous. Not all the listings are necessarily in alphabetical order, but the "Find" function will help.

Requirements in New Zealand

Rule 21.303 requires that a replacement or modification material, part, or appliance to be installed into a type certificated product must "be authorised by the holder of the type certificate as complying with the type design" or, among other things, be "an imported part accepted for the purpose by the Director".

On face value, the latter category would appear to apply to PMA parts, but the relevant advisory circular, AC20-2A *Acceptability of parts* (which provides acceptable methods of compliance with Part 21, Subpart K and Part 43, Subpart B) does not specifically address the issue of PMA parts, even though their use in New Zealand is known to be commonplace. Steps are now being taken to amend the AC to provide for their use, but in the meantime you need be able to demonstrate that the part is in compliance with rule 21.303. These steps provide some guidance:

- When ordering a PMA part, request a copy of the relevant FAA-PMA Supplement, or equivalent manufacturer's document, with the part so that you can prove eligibility for fitting to your aircraft.
- Establish whether the part is an original replacement, or is covered by an STC.
- Also request a properly completed FAA Form 8130-3 *Airworthiness approval tag*. This is of critical importance in the case of finite-life parts.
- When the part is installed, keep a copy of the Supplement or equivalent reference and the FAA Form 8130-3 in the work package.
- Know where you can find information on Instructions for Continued Airworthiness, airworthiness limitations, and warranties, if applicable.
- Establish a means of monitoring the issue of Service Bulletins, Airworthiness Directives and other information applicable to the parts.

Some Things to Consider

By fitting a PMA part, could you be voiding the OEM warranty? Does the replacement part itself have a warranty? Are there instructions for continued airworthiness applicable to the part? Are the airworthiness limitations (service life) of the PMA part the same as the equivalent OEM part? Where is all this information specified? Does your maintenance provider have any or all of the information? Who is going to watch out for Airworthiness Directives and Service Bulletins for the PMA parts on your aircraft? They won't come from the OEM.

Recently, an Australian operator whose Cessna P210N had PMA cylinders installed on its Teledyne Continental TSIO-520 engine, experienced a catastrophic engine failure. During climb, there was a loud bang and a sudden loss of power, resulting in a forced landing. Subsequent inspection of the engine found that a cylinder head had separated from its cylinder barrel.

A mandatory Service Bulletin addressing this failure had been issued by the manufacturer of the PMA cylinders, but the operator was not aware of its existence. The failed cylinder was actually part of a bad batch and would have been replaced free of charge, along with reimbursement of the labour costs.

Conclusion

As with the previous article, this story of the parts is just part of the story. The topic of parts is wide-ranging, with numerous traps for the unwary. For further information, refer to:

AC20-2A *Acceptability of parts*

AC20-3 *Storage and distribution of aeronautical supplies*

AC21-80A *Identification of products and parts – identification information, provision, and replacement*

AC43-3 *Parts documentation – CAA Form One and CAA Form Two*

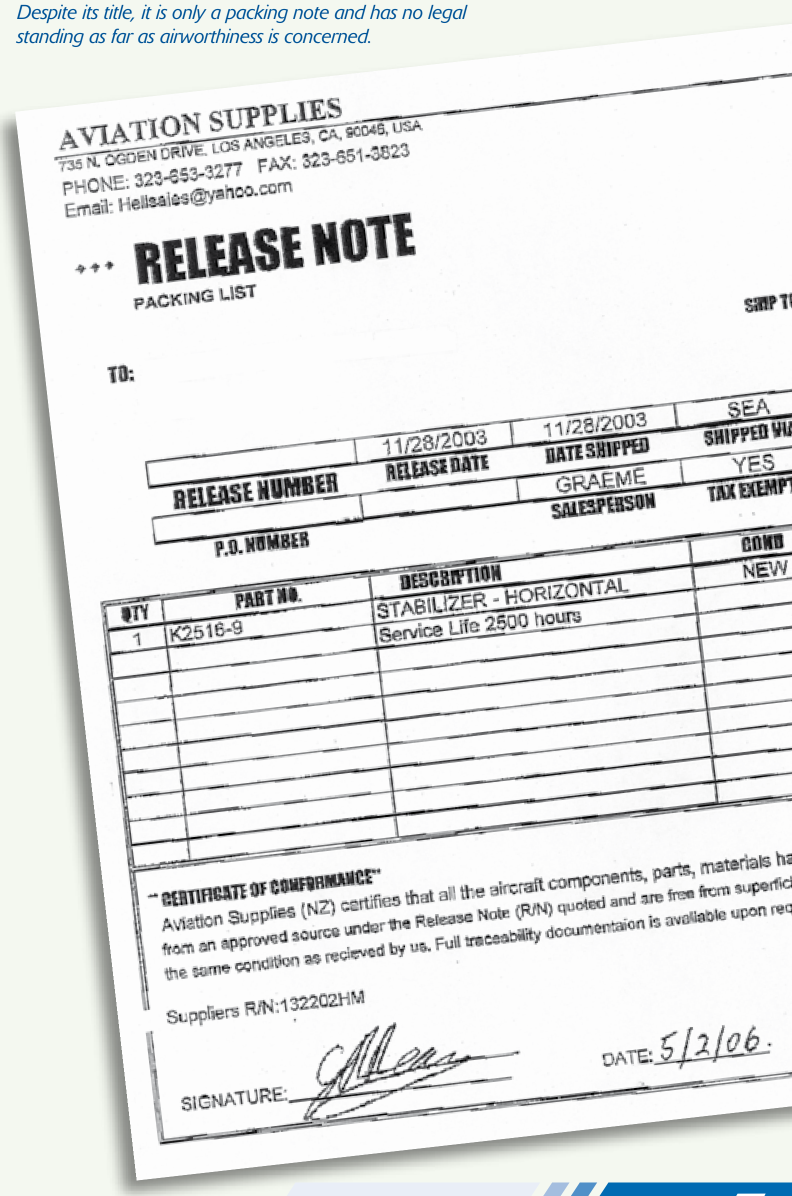
FAR Part 21, Subpart L *Export Airworthiness Approvals*

(FAA) AC21-2K *Export Airworthiness Approval Procedures*

FAA Order 8110.42B *Parts Manufacturer Approval Procedures*

FAA Order 8130.21D *Procedures for Completion and Use of the Authorized Release Certificate, FAA Form 8130-3, Airworthiness Approval Tag.* ■

This document, below, gave rise to the two articles on replacement parts. Despite its title, it is only a packing note and has no legal standing as far as airworthiness is concerned.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RELEASE NOTE
PACKING LIST

TO:

RELEASE NUMBER	11/28/2003 RELEASE DATE	11/28/2003 DATE SHIPPED	SEA SHIPPED VIA
P.O. NUMBER		GRAEME SALESPERSON	YES TAX EXEMPT

QTY	PART NO.	DESCRIPTION	COND
1	K2516-9	STABILIZER - HORIZONTAL Service Life 2500 hours	NEW

"CERTIFICATE OF CONFORMANCE"
Aviation Supplies (NZ) certifies that all the aircraft components, parts, materials ha…
from an approved source under the Release Note (R/N) quoted and are free from superfic…
the same condition as recieved by us. Full traceability documentaion is available upon req…

Suppliers R/N:132202HM

SIGNATURE:

DATE: 5/2/06.

Flight Instructor Seminars

BACK TO THE FUTURE

August 2007

For all instructors in the aviation community

Flight Instructor Seminar Masterton, 2005.

In August 2007 the CAA will present the next round of Instructor Seminars with the theme of "Back to the Future" (back to basic instruction for future instruction).

The keynote speaker is Colin Cox. Colin is a motivational trainer who has an international reputation for providing exceptional training that positively influences his audiences.

These seminars will be held over two days, with learning continuing during the informal parts of the days and evenings. To enable this to happen, all participants will be staying at the seminar venues. A nominal (non-refundable) registration fee will be charged, which includes accommodation (twin share) and all meals.

Closing date for registration is 1 July 2007

Flight Instructor Seminars 2007
For all current Part 149 and Part 61 Instructors

Hamilton – 1 and 2 August (Hamilton Airport Inn)

Masterton – 9 and 10 August (Copthorne, Solway Park)

Ashburton – 14 and 15 August (Ashburton Hotel)

All current Part 149 and Part 61 Instructors are invited to register. Places are limited, so please register early. The registration form is on the CAA web site, and updated information will be posted there as well. All registrations must be accompanied by evidence of instructor rating currency (ie, copy of last renewal flight test report) and the $50 non-refundable registration fee. Substitutions will be permitted. ■

Workshop for Senior Persons, Air Operations

The CAA will hold two training workshops for Senior Persons responsible for Air Operations in organisations holding Part 119/135 certification. It will also be of interest to Part 137 Chief Pilots and Chief Flying Instructors in organisations that hold, or will hold, Part 141 Certificates.

The aim of the workshop is to equip Chief Pilots, Flight Operations Managers, and Chief Flying Instructors with an awareness of the responsibilities of their positions, and to cover the knowledge and tools needed to be an effective Senior Person.

The two-day course will cover the Civil Aviation Act, Civil Aviation Rules, and how operator expositions apply to the Senior Person/Chief Pilot role. The following practical day-to-day aspects of the job will also be covered: Standard Operating Procedures, records and rosters, crew and staff management, training and checking responsibilities, safety culture, and professionalism in the aviation environment.

Senior Persons Workshops

Queenstown

2 to 3 May 2007
Copthorne Lakefront Hotel
Registrations close 20 April 2007

Rotorua

29 to 30 May 2007
Millennium Hotel
Registrations close 18 May 2007

A registration fee of $100 will be charged to help cover costs. Lunch and morning and afternoon teas will be provided on both days. Travel and accommodation is the responsibility of those attending.

If you would like to attend, please complete the registration form on the CAA web site under, "Safety information – Seminars & Courses", and send by email, fax, or post to:

Sue Holliday
GA Group – CAA
P O Box 31 441
Lower Hutt 5040

Email: hollidays@caa.govt.nz
Fax: 0–4–560 9611 ■

OCCURRENCE BRIEFS

LESSONS FOR SAFER AVIATION

The content of *Occurrence Briefs* comprises notified aircraft accidents, GA defect incidents, and sometimes selected foreign occurrences, which we believe will most benefit operators and engineers. Individual accident briefs, and GA defect incidents are available on CAA's web site **www.caa.govt.nz**. Accident briefs on the web comprise those for accidents that have been investigated since 1 January 1996 and have been published in *Occurrence Briefs*, plus any that have been recently released on the web but not yet published. Defects on the web comprise most of those that have been investigated since 1 January 2002, including all that have been published in *Occurrence Briefs*.

ACCIDENTS

The pilot-in-command of an aircraft involved in an accident is required by the Civil Aviation Act to notify the Civil Aviation Authority "as soon as practicable", unless prevented by injury, in which case responsibility falls on the aircraft operator. The CAA has a dedicated telephone number 0508 ACCIDENT (0508 222 433) for this purpose. Follow-up details of accidents should normally be submitted on Form CA005 to the CAA Safety Investigation Unit.

Some accidents are investigated by the Transport Accident Investigation Commission (TAIC), and it is the CAA's responsibility to notify TAIC of all accidents. The reports that follow are the results of either CAA or TAIC investigations. Full TAIC accident reports are available on the TAIC web site, **www.taic.org.nz**.

ZK-NAN, Fokker F27 Mk 500, 27 Feb 03 at 19:50, Blenheim Ad. 2 POB, injuries nil, damage substantial. Nature of flight, training dual.

After simulation of an undercarriage malfunction, which required use of the alternate gear lever, the main undercarriage selector lever was not returned to the DOWN position after the exercise was completed. After engine shutdown at the parking area, the alternate gear handle was returned to the normal position. The undercarriage then retracted, causing major structural damage to the underside of the fuselage.

CAA Occurrence Ref 03/559

ZK-HWV, Hughes 269C, 1 Feb 04 at 10:30, Masterton. 2 POB, injuries nil, damage substantial. Nature of flight, training dual. Pilot CAA licence CPL (Helicopter), age 40 yrs, flying hours 2440 total, 1870 on type, 167 in last 90 days.

The helicopter was on a training flight when a whine was heard through the headsets of the operating crew. The pilot elected to carry out a precautionary landing, but during the flare the tail rotor drive failed, and as a consequence the helicopter landed heavily on one skid. The subsequent engineering investigation found the tail rotor drive pinion had failed forward of the retaining nut on the aft end.

CAA Occurrence Ref 04/299

VH-PTK, Air Tractor AT-502B, 15 Mar 04 at 8:00, Napier. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 49 yrs, flying hours 9659 total, 1496 on type, 123 in last 90 days.

It was reported that on approach the aircraft experienced windshear. This resulted in a heavy landing, damaging the propeller and exhaust. It was found that an incorrect combination of parts was used in the assembly of the propeller during a previous overhaul.

CAA Occurrence Ref 04/954

ZK-MBQ, Piper PA-28-161, 17 Sep 05 at 21:40, Kohimarama Bay. 1 POB, injuries minor, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Aeroplane), age 33 yrs.

The pilot had stolen the aircraft from Ardmore aerodrome, and, while flying around the Auckland Isthmus, was observed by a Police-operated helicopter to descend the aircraft into the sea off Kohimarama. The pilot sustained minor injuries and managed to swim to shore. A CAA field investigation determined that there were no defects existing at the time that would have affected the aircraft's normal flight performance. Control settings in the cockpit, however, and debris found on the fuel filter, suggested that, during low-level flight over water, a situation occurred in which there was an insufficient supply of fuel to the engine, and this was probably the initiator to the ditching.

CAA Occurrence Ref 05/2992

ZK-HEQ, Schweizer 269C, 5 Dec 05 at 9:45, Forest Creek. 3 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Helicopter), age 62 yrs, flying hours 7797 total, 2637 on type, 83 in last 90 days.

The helicopter experienced a downdraught during the takeoff and crashed, resulting in a broken rotor blade and tail rotor. The departure point was 1000 feet above the expected departure point. There was insufficient altitude and power to recover from the downdraught.

CAA Occurrence Ref 05/3950

ZK-HKZ, Aerospatiale AS 350BA, 28 Dec 05 at 8:35, Puriri. 7 POB, injuries 1 serious, damage nil. Nature of flight, private other. Pilot CAA licence CPL (Helicopter), age 30 yrs.

The helicopter landed in a hotel paddock. It is alleged that one of the people loading the helicopter was struck by the main rotor blade after seating the last passenger and exiting to the front of the machine. Neither pilot nor passengers witnessed the event, and the 20-minute joyride flight continued. On returning to the takeoff point, the pilot found an ambulance at the scene.

CAA Occurrence Ref 05/4215

ZK-HMC, Hughes 269C, 21 Jan 06 at 11:37, Blackburn Swamp. 2 POB, injuries 1 minor, aircraft destroyed. Nature of flight, private other. Pilot CAA licence PPL (Helicopter), age 44 yrs, flying hours 191 total, 126 on type, 22 in last 90 days.

The pilot made a precautionary landing after smoke entered the cockpit. The subsequent fire destroyed the helicopter.

CAA Occurrence Ref 06/120

ZK-MBD, Piper PA-28-161, 9 Feb 06 at 9:47, Shannon. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, training solo. Pilot CAA licence PPL (Aeroplane), age 27 yrs, flying hours 129 total, 129 on type, 43 in last 90 days.

ZK-MBL, Piper PA-28-161, 9 Feb 06 at 9:47, Shannon. 1 POB, injuries 1 fatal, aircraft destroyed. Nature of flight, training solo. Pilot CAA licence PPL (Aeroplane), age 20 yrs, flying hours 124 total, 117 on type, 38 in last 90 days.

The aircraft collided while conducting training. The two pilots had departed Palmerston North airport at separate times to engage in general flying training exercises in the southern training area in preparation for their Commercial Pilot Licence flight tests. Witnesses reported to the police that the two aircraft had collided in mid-air. The pilots of both aircraft were found deceased in the wreckage of their respective aircraft. A full accident report is available on the CAA web site.

CAA Occurrence Ref 06/307 and 06/1327

ZK-EGS, NZ Aerospace FU24-950, 18 Feb 06 at 9:17, Pahiatua. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 59 yrs, flying hours 18189 total, 12171 on type, 28 in last 90 days.

The aircraft caught the loader bucket while taxiing away from the loader. Substantial damage was sustained to the rear bulkhead, elevator attachments, rear fuselage, and elevator.

CAA Occurrence Ref 06/464

ZK-EFW, Stoddard-Hamilton Glasair III, 6 Jun 06 at 10:33, Ardmore Ad. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Aeroplane), age 61 yrs, flying hours 1561 total, 0 on type, 1 in last 90 days.

The aircraft was on its first takeoff since manufacture, when at approximately 60 knots the nose landing gear collapsed. The aircraft then veered off the runway and tipped over. No injuries were sustained by the pilot. An engineering report concluded that the most probable cause of the event was flexing of the nosewheel fork and subsequent tensile failure of the nosewheel axle bolt.

CAA Occurrence Ref 06/2085

ZK-EBT, Piper PA-31-350, 8 Jun 06 at 17:30, Lake Haupiri. 1 POB, injuries 1 minor, aircraft destroyed. Nature of flight, ferry/positioning. Pilot CAA licence CPL (Aeroplane), age 67 yrs, flying hours 4236 total, 196 on type, 8 in last 90 days.

The aircraft was to be ferried to Greymouth post maintenance. The PIC discussed weather conditions at the destination with a company pilot prior to departure. The conditions at Lake Haupiri were sufficient for a day VFR departure, with significant cloud surrounding the local hills. The pass through to Greymouth aerodrome was reasonably clear, with a cloud base of approximately 500 to 1000 feet agl. On getting airborne the pilot tracked towards the pass. Further evaluation suggested the cloud was lower than anticipated. The PIC made a decision to return to Lake Haupiri. A right turn was commenced but, shortly after, the aircraft entered low cloud. The PIC descended to remain clear of cloud. During the descent the right wing struck a small tree at an angle of bank of approximately 30 degrees. The PIC then selected full power but was unable to arrest further descent. The aircraft belly landed in the direction of travel. During the landing slide the aircraft turned 180 degrees.

CAA Occurrence Ref 06/2140

ZK-RNR, Jodel D.11, 11 Aug 06 at 17:30, nr Palmerston North. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 54 yrs.

The fuel jet was blocked by foreign matter (tape), which had been used in an inappropriate application. Fuel blockage resulted in power loss and a forced landing, during which the aircraft struck a tree, resulting in major damage to one wing.

CAA Occurrence Ref 06/3040

ZK-HLS, KHI Kawasaki-Hughes 369HS, 18 Aug 06 at 11:00, Lake Ferry. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Helicopter), age 36 yrs, flying hours 3840 total, 20 on type, 45 in last 90 days.

During an agricultural operation, the main rotor blades struck a mechanical loader. This caused serious damage to the blades, and rippling to the fuselage. The helicopter remained on its skids.

CAA Occurrence Ref 06/3096

ZK-HEJ, Robinson R22 Beta, 22 Aug 06 at 15:30, Pentland Hills. 2 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence CPL (Helicopter), age 45 yrs, flying hours 1800 total, 955 on type, 14 in last 90 days.

The crew were engaged in shooting wallabies in rough back country, when the engine began to lose power at around 20 to 30 feet agl. The pilot directed the helicopter to face uphill and tail downhill before trying to land. While doing this, a skid caught a piece of scrub and he lost control. The helicopter landed on the hilly terrain and rolled onto its side, with no injuries to pilot or shooter. The reason for the loss of power is unknown.

CAA Occurrence Ref 06/3134

ZK-MLF, Micro Aviation Bantam B22S, 26 Sep 06 at 12:00, Mount Maunganui. 1 POB, injuries nil, damage substantial. Nature of flight, private other. Pilot CAA licence nil, flying hours 120 total, 120 on type, 3 in last 90 days.

The microlight carried out a forced landing on the beach near Mount Maunganui due to the engine losing power then stopping. The microlight sustained some structural damage. An engineering investigation was carried out and the engine and fuel system inspected. No defects could be found, and the engine was ground-run satisfactorily.

CAA Occurrence Ref 06/3588

ZK-CHW, Jabiru J200, 29 Sep 06 at 12:20, New Plymouth. 2 POB, injuries nil, damage minor. Nature of flight, private other. Pilot CAA licence PPL (Aeroplane), age 47 yrs, flying hours 441 total, 32 on type, 18 in last 90 days.

A loss of fuel through the port wing fuel drain resulted in a forced landing into a paddock. This resulted in damage to the undercarriage.

CAA Occurrence Ref 06/3623

ZK-EQU, Piper PA-28-161, 25 Oct 06 at 11:50, Invercargill Ad. 1 POB, injuries 1 minor, damage substantial. Nature of flight, training solo. Pilot CAA licence nil, age 19 yrs, flying hours 15 total, 15 on type, 15 in last 90 days.

The student pilot was carrying out solo circuit consolidation on sealed Runway 22 at Invercargill. After approximately 30 minutes, ATC asked the pilot if he was able to accept Grass Runway 22 as this would assist them with a regional commuter that was intending to take off on Runway 04.

The pilot accepted the grass runway and continued with his approach, which was too high and fast. This resulted in the landing taking place well down the runway. The pilot then decided there was insufficient runway remaining to continue with the touch-and-go and attempted a full-stop landing. Given the touchdown point, there was insufficient runway available to stop before running into a ditch immediately off the end of the grass runway.

CAA Occurrence Ref 06/3870

ZK-HUZ, Hughes 369D, 4 Nov 06 at 17:00, Kaimanawas. 0 POB, injuries nil, damage minor. Nature of flight, other aerial work. Pilot CAA licence CPL (Helicopter), age 50 yrs, flying hours 22964 total, 1150 on type, 158 in last 90 days.

The pilot landed the helicopter and exited to uplift some equipment. While he was doing this, the helicopter rolled backwards over a bank.

CAA Occurrence Ref 06/4060

GA DEFECT INCIDENTS

The reports and recommendations that follow are based on details submitted mainly by Licensed Aircraft Maintenance Engineers on behalf of operators, in accordance with Civil Aviation Rules, Part 12 *Accidents, Incidents, and Statistics*. They relate only to aircraft of maximum certificated takeoff weight of 9000 lb (4082 kg) or less. These and more reports are available on the CAA web site, www.caa.govt.nz. Details of defects should normally be submitted on Form CA005 or 005D to the CAA Safety Investigation Unit.

The CAA Occurrence Number at the end of each report should be quoted in any enquiries.

Key to abbreviations:

AD = Airworthiness Directive	**TIS** = time in service
NDT = non-destructive testing	**TSI** = time since installation
P/N = part number	**TSO** = time since overhaul
SB = Service Bulletin	**TTIS** = total time in service

Aerospatiale AS 355F1
Anticipator Cable

The collective was reported as feeling "notchy". The anticipator cable was being partially seized, causing the anticipator spring unit to override and allow collective control. The cable was replaced.

ATA 6710 CAA Occurrence Ref 05/2643

Aerospatiale AS 355F1
Honeywell Power Turbine Governor P/N 23076061

Engineers reported that during a spline drive inspection the torsional spline drive assembly was found to have separated from the power turbine governor (PTG) drive shaft, when the PTG was withdrawn from its engine gear box mounting pad. A closer inspection of the drive shaft revealed excessive wear in the area of the torsional spring drive where it contacts the driveshaft, and failure of the epoxy bonding material. The cause is unknown, but this aircraft had experienced a starter generator vibration problem 142 hours previously; this could be related. The PTG was replaced. TSI 415 hours, TTIS 809 hours.

ATA 7320 CAA Occurrence Ref 05/2994

Aerospatiale AS 355F1
RR C20F Combustion Outer Can P/N 6870992

The outer part of the combustion can had a crack 2 inches long adjacent to the igniter plug boss, on the vertical plane when fitted. The crack was probably due to fatigue.

ATA 7200 CAA Occurrence Ref 05/2812

Bell 206B
4305-7150L Indicator Direction Gyro P/N 206-075606-10

The pilot detected a burning smell inside the cockpit. Closer inspection revealed smoke appearing from behind the ADF indicator. The circuit board in the ADF indicator case was found to be burnt out. The ADF indicator system was removed from the aircraft.

ATA 3451 CAA Occurrence Ref 06/1245

Bell 206L
Main Rotor Mast

While the aircraft was undergoing a 1500-hour mast inspection, the mast bearing nut was found to be loose. Movement in the nut allowed fretting to occur and water to get past the sealant on to the mast. Corrosion was evident on the mast pole. The nut was retained in place by the lockplate, which is what it is designed to do, so there was no safety of flight issue.

ATA 5300 CAA Occurrence Ref 05/3397

Britten-Norman BN2A-27
Tank cap

During takeoff, the aircraft veered to the right of the runway centreline. A glance at the rpm indicators revealed that the RH engine had reduced to 2000 rpm. Takeoff was aborted. Water was found in the fuel system. It was found that the right wing tank fill cap was not sealing correctly. Tanks are to be modified.

ATA 2810 CAA Occurrence Ref 06/1691

Cessna 172M
Carburettor finger filter

During the takeoff, at around 100 feet agl, the engine started making a crack sound. The pilot manoeuvred for and made a normal landing. An engineering investigation revealed the carburettor finger filter was partially blocked with lint. The filter was cleaned and no further fault was found.

ATA 8500 CAA Occurrence Ref 05/2374

Cessna 172M
Battery Terminals

During flight the aircraft experienced a total loss of electrics. The electrical power was regained just before landing. Inspection revealed that the battery terminals were loose. The loose terminals may have caused the alternator to overload and overheat the voltage regulator, causing the thermal cut-out to trip.

ATA 2430 CAA Occurrence Ref 06/1656

Cessna 172RG
Cigar Lighter Resistor

While on finals to land, a violent electrical explosion was experienced near the pilot's knee and the magneto switch. The cockpit filled with the smell of electrical insulation smoke. The cigarette lighter socket was in use at the time, powering a portable GPS unit. Investigation revealed the cigarette lighter resistor was blown apart, leaving charred debris.

ATA 2400 CAA Occurrence Ref 05/2965

NZ Aerospace FU24-954
Auxiliary Air Valve

The aircraft was positioned on a medium steep strip for takeoff after completing a job. The brakes were released and the throttle was opened. The engine suddenly died and the aircraft came to rest 15 metres from the end of the runway. An inspection of the engine revealed that the auxiliary air valve had torn away from the fibreglass duct and had blocked off the air intake.

ATA 7160 CAA Occurrence Ref 05/2336

Pacific Aerospace 750XL
Hose Cross Feed P/N 11-57115-1

Fuel was seen dripping out of the fuselage when the aircraft was parked. The forward fuel tank cross feed hose was found to be leaking at the join, caused by scratches found on the joiner pipe. The reinforcing wire braid had not been trimmed correctly, causing damage to the aluminium hose joiner. This prevented the hose from sealing and allowed fuel to leak from the joiner assembly and into the fuselage compartment. TTIS 1345 hours.

ATA 2800 CAA Occurrence Ref 04/4297

Pacific Aerospace Cresco 08-600
Fuel tank LE Ribs

During an inspection of the aircraft, the outboard leading edge rib of the righthand fuel tank was found cracked at the upper camber flange, and the outboard leading edge fuel tank baffle was cracked at the lightening hole. Repaired with an approved repair scheme. This may have been a defective batch of components caused by the manufacturing tooling. TTIS 7042 hours.

ATA 5700 CAA Occurrence Ref 05/2332

Pacific Aerospace Cresco 08-600
Belly Stress Band P/N 08-10193-2

The aircraft was found to have a stress band cracked at the outboard ends. The stress band was repaired by an approved repair scheme. Once the repair scheme is carried out, the stress bands do not appear to crack again. TSO 1000 cycles, TTIS 2116 hours.

ATA 5300 CAA Occurrence Ref 05/2333

Partenavia P 68B
Wing Flap and Aileron supports P/N 6B-1-3041-3/4-3043-2

Severe corrosion found in the flap support mating surfaces when the supports were removed from the spar. When inspected per SB91, no corrosion was evident. Corroded parts were replaced. TTIS 12048 hours.

ATA 2700 CAA Occurrence Ref 05/2647

Partenavia P 68B
Stabilator

The stabiliser mass balance weight on the LH side was found loose due to bolt movement. A penny washer was fitted to the attachment bolt to provide greater bearing area.

ATA 2740 CAA Occurrence Ref 05/2646

Piper PA-28-161
Carburettor

Fuel was leaking excessively from the carburettor overflow. The float valve was found jammed due to wear.

ATA 2800 CAA Occurrence Ref 05/2805

Piper PA-28-161
Master switch P/N 587-828

On base leg in the circuit, the pilot noticed an unusual smell accompanied with a small amount of smoke coming from behind the master switch. The pilot turned the master switch off and the smoke dissipated. The master was turned back on and the aircraft landed without further incident. Investigation revealed internal arcing of the contacts inside the pitot-heat switch. The switch was replaced. TSI 97.56 hours, TTIS 9795.38 hours.

ATA 3030 CAA Occurrence Ref 05/3701

Piper PA-28R-200
Main landing gear P/N 95643-07

A 5/8-inch sidebrace stud was cracked in the undercarriage leg. It was found while carrying out AD PA28/182A. TTIS 4143 hours.

ATA 3210 CAA Occurrence Ref 05/2619

Piper PA-31
Filter bowl P/N 460.635

When demonstrating a stall to a trainee pilot, the crew became aware of a hydraulic problem when they went to lower the gear and nothing happened. They turned back to the aerodrome and landed safely. Investigation revealed that the LH hydraulic filter bowl had cracked around its circumference in the threaded part of the bowl. The reason was suspected over-tightening of the filter bowl at some stage of its life.

ATA 2910 CAA Occurrence Ref 05/2524

Piper PA-31-350
Dip Stick

While in cruise, the pilot noticed oil on the lefthand engine cowl. The pilot made a PAN call and carried out a diversion, landing safely. The engineer found that the dipstick was not seated properly in the oil filler extension. Further examination revealed that the associated O-ring seal was worn. It was replaced. TTIS 11024 hours.

ATA 3430 CAA Occurrence Ref 05/2889

Piper PA-31-350
Garrett Compressor Wheel P/N 409170-9001

During an inspection of the lefthand engine turbocharger installation, damage was found to the inlet face of the turbocharger compressor wheel. The turbocharger was repaired and required a new compressor wheel. Further engineering investigation revealed the damage to the turbocharger compressor wheel was due to one nut and washer from the alternate air door pivot shaft coming loose and passing through the turbocharger. TSO 256 hours.

ATA 8500 CAA Occurrence Ref 05/3141

Piper PA-31-350
Wiebel Hydraulic Pump P/N 1213HBG310

The aircraft hydraulic pump failed on the righthand engine. The gear would not retract and was locked down with three greens. The aircraft re-circuited to make a normal landing. On removal of the hydraulic pump it was noted the circlip retaining the drive shaft seal had become displaced from the groove, but was prevented from completely disengaging from the groove by the shaft. The shaft seal had then become displaced from its seat, allowing hydraulic fluid to pass around the outside of the seal. Pump operation drained the hydraulic system fluid overboard through the pump case drain hose, covering the RH main landing gear and lower wing surface.

ATA 3200 CAA Occurrence Ref 05/2714

Piper PA-32-260
Elevator trim cable P/N NAS312-C16-2020

The pilot reported that the elevator trim was difficult to operate. The trim cable forward LH had a few broken strands due to fatigue and was replaced. The high number of cycles on short flights for the number of hours flown is a contributing factor and makes the defect a known problem. The tension on the cable is specified in the autopilot maintenance manual. TSI 100 hours, TTIS 2238 hours.

ATA 2732 CAA Occurrence Ref 05/2620

Piper PA-34-200
RH up limit switch P/N 67411-007

Shortly after takeoff, the pilot reported an unsafe undercarriage indication and requested a flypast of the control tower. The undercarriage was inspected and appeared to be retracted. The pilot elected to continue VFR to the planned destination, where the aircraft was landed without incident. An engineering investigation traced the fault to the RH up limit micro switch.

ATA 3200 CAA Occurrence Ref 05/2262

Piper PA-34-200
Master switch P/N 587-837

The aircraft experienced an electrics failure. Communications were established by cell phone, and with assistance from radar the aircraft was able to descend VFR and land. An engineering investigation revealed that the contacts of the master switch for the master solenoid had failed. This had caused the master relay to have an open circuit. A new master switch was fitted. The cause was water contamination from a leaking side window. TTIS 7861 hours.

ATA 2400 CAA Occurrence Ref 05/2380

Robinson R22 Beta
Belt Drive Actuator P/N A184-3

The operator reported that the clutch light flickered at 100% NR while on the ground. Investigation revealed that the upper drive bearing had failed, which was attributed to corrosion seizing the bearing after it had been inactive for an extended period of time. TTIS 1436.8 hours.

ATA 6300 CAA Occurrence Ref 06/1817

Robinson R44 II
Servo Fuel Injector

Shortly after takeoff the engine incurred a loss of rpm, and a forced landing became necessary. During the descent, complete failure of the engine occurred. Engineering inspection found contamination in the fuel servo unit. The contaminants were identified by a specialist facility as aluminium swarf and aluminium by-products from corrosion. The manufacturer was informed of the event but has not responded as to how the swarf and corrosion came to be in the unit.

ATA 2800 CAA Occurrence Ref 05/3243

Tecnam P96 Golf
Engine Mount Frame

During the pre-flight inspection the pilot found a broken cross tube on the engine mount. A new engine frame assembly was fitted.

ATA 7120 CAA Occurrence Ref 05/3390

GONE?

Section 8 (2) of the Civil Aviation Act 1990 requires every applicant for a New Zealand aviation document to supply an "address for service" in New Zealand including, where applicable, telephone and facsimile numbers.

The Act also requires aviation document holders to notify the Director promptly of any changes to the address for service, telephone number or facsimile number.

You can change your address for service by emailing or writing to the CAA.

info@caa.govt.nz

Civil Aviation Authority
P O Box 31 441
Lower Hutt 5040

CAA
CIVIL AVIATION AUTHORITY OF NEW ZEALAND