



Agricultural Aircraft Accident Safety Concerns



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1. Overview

Following the serious accidents on 10 April 2010 to Airtractor 402B, ZK-PCC and on 20 April 2010 to FU24-950, ZK-EGT which resulted in the destruction of both aircraft and serious injuries to the pilots, it was determined after SIU field investigations of both accidents that serious safety concerns and disturbing trends were apparent.

Both accidents had similar characteristics namely;

- The aircraft were overloaded for the ambient conditions
- Both airstrips are considered unsuitable for agricultural aircraft operations
- The accident occurred on the first flight of the day from that particular airstrip
- Both pilots are very experienced agricultural pilots
- Jettison of the agricultural load was not effectively carried out
- Both aircraft struck terrain in the take-off flight path
- No wind indicators were used
- One pilot does not wear a protective helmet, the other wears one but does not secure the chinstrap
- Between the two pilots they have amassed 30,000 agricultural flight hours, approximately 360,000 sorties and have suffered 8 accidents
- The aircraft types demonstrated similar flight paths, impact signatures and damage patterns but demonstrated divergent aspects of cockpit integrity and safety

2. Further research

A review was then undertaken of recent similar accidents – 18 Jan 2008 to present – that anecdotal evidence suggested might link to the recent occurrences, an overview of which is attached;

Serious Accidents

1. 2008, Cresco, Take-off phase, Nil injuries, Aircraft extensively damaged, pilot 13,000 hours, 5 previous accidents.

Pilot operating with tail wind failed to achieve positive rate of climb after take-off and struck terrain some distance from the airstrip. No jettison evident, no windsock in use, protective helmet used.

2. 2008, FU24, Take-off phase, Serious injuries, Aircraft destroyed, pilot 3000 hours, 1 previous accident.

Pilot had refuelled aircraft and recommenced operations without downloading fertiliser load. Resumed operations, failed to become airborne, attempted to jettison

load just prior to impact with rising terrain in flight path. No windsock in use, pilot not wearing protective helmet.

3. 2008, R44, Lift off, Nil injuries, Machine destroyed, Pilot 4000 hours, nil previous accidents.

Pilot operating from confined loading area with strong prevailing wind. Lost RRPM on lift-off for the first load of the day, attempted to recover this by diving turn crosswind due terrain, collided with ground and power wire simultaneously. No windsock in use, no jettison of the agricultural load, pilot wore a protective helmet.

4. 2008, Cresco, Take off, **Fatal**, Aircraft destroyed, Pilot 12,000 hours, 1 previous accident.

Pilot possibly overloaded the aircraft for the prevailing conditions, experienced sink after take-off, left the jettison of the load too late, struck a fence with the rear fuselage that disrupted the elevator control system. With loss of control the aircraft impacted terrain some 2 kms from the airstrip and the pilot was killed. A windsock was in use but was deemed to be ineffective due its location, pilot was wearing a protective helmet but the accident was not survivable.

5. 2009, Cresco, Take off, Moderate injuries, Aircraft destroyed, Pilot 15,000 hours, 1 previous accident.

Pilot overloaded the aircraft for the prevailing conditions and struck a fence on the boundary of the airstrip in use. The resulting ground impact destroyed the aircraft and the pilot was trapped in the wreckage. No jettison was conducted, no windsock in use, pilot wore a protective helmet, loader truck suffering from structural cracking.

6. 2010, Airtractor, Take off, Moderate injuries, Aircraft destroyed, Pilot 22,000 hours, 7 previous accidents.

On the first sortie of the day the pilot overloaded the aircraft for the prevailing conditions. Tail wind conditions were reported, airstrip upslope and poor surface conditions evident. Aircraft failed to climb after lift-off, no evidence of jettison, during a left turn away from rising ground the aircraft struck the terrain. No windsock in use, no protective helmet worn.

7. 2010, FU24, Take off, Serious injuries, Aircraft destroyed, Pilot 7000 hours, Nil previous accidents.

The pilot had been operating in the same area during the morning. This was the first take-off from this airstrip and the pilot overloaded the aircraft for the prevailing conditions. The prevailing winds were described as gusting, temperature 20+C. The aircraft became airborne but failed to out-climb the steeply rising terrain ahead in the flight path. The jettison of the load was left too late and commenced just prior to ground contact. A protective helmet was worn but the chinstrap was not fastened, a windsock was available but early indications suggest it was not in use at the time.

3. Data from the above summaries;

Overall

- | | |
|---|----------------------------|
| • Total flight hours | 76,000 hours |
| • Estimated total number of trips flown | 912,000 trips |
| • Total number of historical accidents suffered | 20 (2 responsible for 12) |
| • Average age of pilots involved | 45.5 years |

From summary

- | | |
|---|---|
| • Total number of pilots involved | 7 |
| • Total number not using windsocks | 6 |
| • Total number <i>not</i> wearing protective helmet
(Plus 1 not secured) | 3 |
| • Total number of aircraft overloaded for the
prevailing conditions | 7 |

Injuries to aircrew

- | | |
|--------------------|---|
| • Fatal injuries | 1 |
| • Serious injuries | 3 |
| • Nil injuries | 3 |

Social Cost

- | | |
|-------------------------------------|------------------|
| • 1 Fatal @ NZ\$ 3.523M | 3,522,800 |
| • 3 Serious @ NZ\$368,000/ accident | 1,104,000 |
| • 2 Minor @ NZ\$15,600/ accident | <u>31,200</u> |
| Total NZ\$ | <u>4,658,000</u> |

Operational

- 3 pilots employed by large size aerial agricultural companies (10 and 8 aircraft respectively.)
- 1 pilot employed by medium sized company (4 aircraft)
- 1 pilot employed by single aircraft operator

- 1 pilot/owner of single aircraft
- 1 pilot employed by medium size helicopter company (5 machines)

Aircraft Damage

- Aircraft destroyed 6
- Extensive damage to aircraft 1

Capital Cost

(Estimated from prices at time of accident)

2 Cresco destroyed	2,400,000
1 Cresco extensive damage	600,000
2 FU24 Fletcher (piston)	400,000
1 Airtractor 402B	1,000,000
1 Robinson R44	<u>750,000</u>
Capital	5,150,000
Social	<u>4,658,000</u>
Grand Total	<u>9,808,000</u>

(Cost vs. Total trips flown = \$10.75, vs. Tonnes sown= \$11.80/tonne)

4. Other Linked Occurrences

1. 2005, Cresco, Take-off, Nil injuries, Aircraft substantial damage, Pilot 12,000 hours, 1 previous accident.

Aircraft failed to attain climb after take-off from farm airstrip as the pilot had overloaded the aircraft for the prevailing conditions. The aircraft struck level ground out from the end of the airstrip and suffered significant damage to the wings and rear fuselage. Not reported to CAA. No windsock, pilot wore protective helmet.

2. 2007, Airtractor , Take-off, Nil injuries, Substantial aircraft damage, Pilot 11,000 hours, 1 previous accident.

The pilot had assessed a change in the weather conditions that would adversely affect the performance of the aircraft from the marginal airstrip and had selected a lighter payload to be loaded. During the take-off run it soon became obvious that the load was heavier than requested and combined with a distinct change in wind velocity a decision was made to jettison the load. This was completed but the low speed of the aircraft allowed it to sink where the right wing struck a fence causing aileron and flap damage that jammed the controls in the neutral position. The aircraft was flown straight ahead for 3 kms over hilly terrain and landed as soon as possible. A windsock was in use and strategically positioned. The pilot wore a protective helmet.

3. 2008, FU24, Take-off, Nil injuries, Substantial aircraft damage, Pilot 12,000 hours, 1 previous accident.

The pilot elected to operate from an airstrip that had been previously assessed by other operators as inadequate and not to be used by that company's aircraft. The pilot had overloaded the aircraft for the prevailing conditions and during a take-off had allowed the aircraft to sink and collide with terrain in the flight path. The aircraft suffered extensive damage to the undercarriage, flaps and rear fuselage and was flown to a nearby airstrip and landed. No jettison action took place, no windsock was evident and the pilot did not wear a protective helmet.

4. 2009, GA200, Take-off, Nil injuries, Minor damage, Pilot 3,000 hours, 2 previous accidents.

The pilot overloaded the aircraft for the prevailing conditions and during the take-off struck a fence with the undercarriage as the aircraft became airborne. There was limited assessment of the wind velocity and no jettison action was completed. A windsock was in use and the pilot wore a protective helmet.

5. 2009, Airtractor, Nil injuries, Take-off, Substantial damage, Pilot 21,500 hours, 6 previous accidents.

The pilot overloaded the aircraft for the prevailing conditions and during the take-off from the sloping airstrip struck the fence at the end of the strip causing damage to the aileron, flap and wing structure. The wind velocity was described as changeable and a tail wind on take-off had been prevailing for most of the day. No windsock was used and the pilot did not wear a protective helmet.

5. Data from above occurrences

Overall

• Total flight hours	59,500
• Total trips flown	685,000
• Historical accidents suffered	11
• Pilots average age	50.4 years
• No. Of pilots	5
• Number using windsocks	3
• Number <i>not</i> wearing protective helmet	2
• Number overloaded for the conditions	5
• Approximate capital cost of aircraft repairs	NZ\$ 1,000,000

6. Human factors in all accidents

Determined, but not limited to, the following;

- Poor decision making as to personal safety and health
- Poor decision making regards airstrip selection
- Poor decision making regards prevailing met conditions
- Inadequate procedures for assessing aircraft performance
- Inadequate techniques associated with jettison of the load
- Peer pressure to operate from inadequate airstrips
- Operational pressure due competition for work
- Personal conflicts affecting decision making
- Financial pressure
- Time management conflict

7. Other factors

- Aircraft design and crashworthiness
- Industry standards
- Airstrip standards (lack of)
- Operational ethics
- Customer expectations
- Airstrip Guide – CAA, NZAAA, DOL, FF
- E Cat Instructor issue, maintenance and standards
- Training standards for pilots
- (In)Adequate Annual Competency Assessment testing
- Part 137 rewrite
- NZAAA Accreditation
- Failure of a functioning jettison system to prevent most of these recorded accidents
- Employee and employer compliance with HSE Act and Guidelines as published.

8. Quote in Summary

“It is high time that industry, farming interests, and others involved in agricultural flying operations took a close look at a situation which has for too long been incompatible with flight safety precepts. Irregular practices likely to result in serious accidents involving loss of life and damage to the economy through loss of aircraft must be eliminated within the shortest possible time.”

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30 May 1967

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9. Notes

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