

**Rural & Regional Affairs and Transport Legislation Committee**  
ANSWERS TO QUESTIONS ON NOTICE  
Additional Budget Estimates February 2014  
**Infrastructure and Regional Development**

**Question no.:** 195

**Program:** n/a

**Division/Agency:** (CASA) Civil Aviation Safety Authority

**Topic:** Colour Assessment Diagnosis Test

**Proof Hansard Page:** 54 (24/02/2014)

**Senator Fawcett asked:**

**Senator FAWCETT:** I have a letter dated 24 January this year from CASA to a gentleman saying, 'CASA has determined the colour assessment diagnosis test to be an appropriate test for the purposes of the regulation' and it appears to be the test that CASA is now using to apply. My question is, in accordance with your letter, who made the decision that it is an appropriate test and on what basis did they make that decision?

**Mr Fereday:** It would have been for an individual occurrence; it's not across the board. All testing for colour vision is on a case-by-case basis; in terms of that decision it would have been our principal medical officer.

**Senator FAWCETT:** Clearly at some point in time somebody has decided that the test has a degree of efficacy that makes it worthwhile to use. My question is: who made that decision and on what basis?

**Mr Fereday:** It would be the basis of medical evidence of the test's validity. We could provide on notice the actual details of why that approach was the appropriate one.

**Answer:**

Testing for colour vision defects is conducted in accordance with the relevant medical standards (i.e. class 1, 2 or 3) as set out in Part 67 of the *Civil Aviation Safety Regulations (CASR) 1998*. In the case of an applicant for a class 1 or 2 medical certificate CASR 67.150(6) and CASR 67.155(6) respectively impose a three-level assessment of colour vision with testing to be conducted in the following order:

- application of the Ishihara 24-plate type test with no more than two errors;
- for those who fail Ishihara testing, a second test may be undertaken which requires the applicant to readily identify aviation coloured lights through application of a Farnsworth colour-perception lantern at less than specified error rates; and
- for those who fail the above tests, a third level of testing (as determined by CASA) requires the applicant to correctly identify all relevant coloured lights in a situation which simulates an operational environment.

The third level of test to be completed is a matter for CASA to determine. In the specific case under consideration (being the individual referred to in the letter from CASA of 24 January 2014) the applicant had previously undertaken and failed on repeated occasions the third level testing. On those previous occasions, dating back to 2005, the applicant failed both the control tower signal gun test and also the Practical Aviation Lantern Test.

Noting the concerns which arise in ensuring the reliability of test results where repeat testing occurs, together with more recent developments in developing aviation specific colour vision tests, the recently devised CAD test was chosen by CASA's Principal Medical Officer as the most suitable third level test for the assessment of this particular individual.

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**Topic:** Safety – Colour Vision Deficiency

**Proof Hansard Page:** 55 (24/02/2014)

**Senator Fawcett asked:**

**Senator FAWCETT:** One of the concerns that I have is that since the Denison case here in Australia some two decades ago we now have pilots with over 10,000 hours of flying, many of them single pilot night IFR who have conducted countless night approaches using PAPIs as they have come on line, as well as the TVASI and there have been no safety incidents. We confirmed that last estimates between ATSB and CASA, that there have been no incidents recorded. So, my question is: if we have 20 years of experience versus the UK where it is essentially an academic development that proves that somebody has a colour vision deficiency, where is the safety case that justifies the adoption of this test?

**Mr McCormick:** You mean changing the initial test to this CAD test?

**Senator FAWCETT:** Any of the tests that are essentially an academic determination that you have a colour vision deficiency as opposed to the intent of 67.150 which looks at what are the operational ways of testing whether this deficiency in fact affects your ability to safely operate an aircraft.

**Mr McCormick:** I think you will find that there has been a 727 crash in the United States which was attributed to the colour blindness of the co-pilot.

**Senator FAWCETT:** There is one incident and that attribution has been disputed, particularly since the captain of the aircraft was not colour vision deficient, who was also on the flight deck at the time, and the fact that PAPIs are well known to have distortion under certain atmospheric conditions which is off-quoted as the real cause of that accident.

**Mr McCormick:** Yes. The academic literature does tend to cite that. There are numerous maritime accidents, of course, with colour vision deficiency that we are not particular concerned about at this moment. The colour vision testing on the 67.1506C—CASA is empowered to determine the type of third level testing to be applied. My notes say that the colour assessment and diagnosis, CAD, test was developed by City University in London, with research funding assistance from both the UK CAA and the US FAA. It has been officially adopted, as you say, for use in the UK and we believe that aviation specific tests, such as that test, are better suited than the previous use practical tests for detecting colour vision deficiency due to their direct relevance to aviation specific tasks.

As far as the safety case goes around changing from the Ishihara, or the colour plate test, to some other test, we will have to take that on notice.

**Answer:**

The legislative requirements for colour vision testing are contained in Part 67 of the Civil Aviation Safety Regulations 1998. For an applicant for a class 1 medical certificate, Item 1.30 of Table 67.150, titled “Colour perception”, requires that an applicant can “readily distinguish the colours that need to be distinguished for the safe exercise of privileges or performance of duties, under the relevant licence”. Regulation 67.150(6) provides:

**67.150**     **Who meets medical standard 1**

(6)     A person must demonstrate that he or she meets the criterion in item 1.39 of table 67.150 by:

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- (a) *in daylight, or artificial light of similar luminosity, readily identifying a series of pseudo-isochromatic plates of the Ishihara 24-plate type, making no more than 2 errors; or*
- (b) *for somebody who makes more than 2 errors in a test mentioned in paragraph (a), readily identifying aviation coloured lights displayed by means of a Farnsworth colour-perception lantern, making:*
  - (i) *no errors on 1 run of 9 pairs of lights; or*
  - (ii) *no more than 2 errors on a sequence of 2 runs of 9 pairs of lights; or*
- (c) *for somebody who does not satisfy paragraph (a) or (b), correctly identifying all relevant coloured lights in a test, determined by CASA, that simulates an operational situation.*

CASA is required to apply the above testing processes to determine whether an applicant meets the medical standard. CASA does not accept that the structure of Regulation 67.150 is concerned with operational ways of testing as opposed to the application of medically developed and verified testing, such as the Ishihara and Farnsworth tests.

CASA considers that the third level of testing is intended to simulate an operational situation but in the context of a defined medical standard and by a medically verifiable means. CASA does not consider that the use of a flight simulator of itself would be consistent with the legislative requirements and intent.

CASA has not proposed any changes to the above legislative requirements which provide for multiple levels of colour vision testing (in contrast to a number of other international aviation regulators). The issue of whether or not an applicant meets the relevant colour vision standard is distinct from whether the applicant should be issued with a conditional medical certificate. In such instances, an applicant who fails the colour vision standard is then assessed by CASA as to the extent to which the medical standard is not met and whether this is likely to endanger the safety of air navigation.

CASA is aware that other jurisdictions are looking at using other tests instead of either the Ishihara or Farnsworth tests. Applicants assessed by CASA will already have completed both stages of testing before being assessed under the third level of testing.

CASA is considering the use of the CAD test for a person who fails both the Ishihara and the Farnsworth tests.

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**Question no.:** 197

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**Topic:** Safety – Colour Vision Deficiency

**Proof Hansard Pages:** 55-56 (24/02/2014)

**Senator Fawcett asked:**

**Senator FAWCETT:** My point is that in an environment where the industry is struggling to attract and retain pilots we have a whole cohort now in Australia who have been flying safely with no incidents, which has been confirmed by ATSB and yourself, for the past two decades in Australia, yet since the introduction of this CAD test we are now seeing CASA withdrawing the privileges of pilots who have been flying for thousands of hours quite safely on the basis of a test that has been academically derived. My question to you is: what is the safety case for withdrawing the privileges of a licence for somebody who has demonstrated over a number of years and thousands of hours of flying that they can competently operate the aircraft?

**Mr McCormick:** I am not aware of any specific cases and assuming, as you say, there have been cases where we have withdrawn privileges, I am not aware of that myself. The issue about the eyesight test is, of course, that there is a standard which is applied by ICAO. We are already much more liberal than that standard anywhere in the world and necessarily saying 20,000 hours or 10,000 hours represents therefore a valid safety case because it has been 10,000 times is not necessarily the same thing as saying it is either one hour experienced 10,000 times or it is 10,000 hours experience as far as the events go themselves.

I think we are looking now at carefully moving forward, or in some cases if this test has been adopted by the UK CAA and is obviously under consideration by the FAA, we would look at moving, as it says, to where the appropriate and sophisticated medical research methodologies have led. It is the mere fact of updating things. As for actually the removing the issues, I will take that on notice. I do not know who we have removed privileges from.

**Senator FAWCETT:** I can give you the letter afterwards. I have it sitting right here in front of me from your organisation dated 24 January doing exactly that. I will put it to you that with due respect this is not moving forward, despite the evidence that you gave here at estimates in November that CASA had no agenda or no plans to wind back the gains of the Denison case. This is, in fact, a very deliberate effort to adopt a standard which might medically ascertain that somebody does have a colour vision deficiency, but clearly as evidenced by multiple pilots that have flown for over two decades, it is not an accurate or effective measure of their ability to safely operate an aircraft. This is going backwards and not, in fact, forwards.

**Mr McCormick:** As I said, what has happened between November when I was here and that letter, this is the first that I know of it. We were, of course, expecting to be in the AAT to respond to a Mr O'Brien in February 2012, however, those proceedings are currently not listed for hearing as the previous hearing to commence on 31 March was vacated at the applicant's request. So we have not had the opportunity to test these things. As I said, that is news to me. I will take it on notice and find out what we have been doing.

...

**Senator FAWCETT:** If you want to come back to experts, your organisation's previous experts, Ladel, Brock, Wilkins and others, were very proactive in recognising that practical tests were a viable alternative and, in fact, that many people with a CVD were able to fly. Their judgment has proven correct by virtue of the incident-free 20 years of flying. Is it the case that a personality has changed, not the science and not the safety? A personality has changed and now CASA's approach to this issue is changing?

**Mr McCormick:** I am not aware of any changes around our approach to this. As I said, that letter is news to me. I am not across everything that leaves the building, particularly medical matters where I normally do not involve myself. We will take it on notice and I will get you an answer about what has transpired.

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**Answer:**

CASA is unaware of any specific instances where a pilot's privileges have been removed by CASA following completion of a CAD test. Since the Senate Estimates hearings, a decision has been made in relation to one applicant who underwent and failed CAD testing, to impose modified conditions of operation on his licence. This included a restriction upon the pilot operating solo at night time. Otherwise the pilot remains able, as has been the position for approximately the past nine years, to operate under the privileges of his commercial pilot licence but not his air transport pilot licence (ATPL).

CASA obtained detailed specialist opinions from within Australia and internationally which supported the restriction upon ATPL operations. The applicant represents a person who has among the most severe form of colour deficiencies and has failed (to CASA's knowledge) at least eight separate colour vision tests.

CASA also looked at the current aviation medical research across the world in relation to colour vision testing to ensure that a fair and appropriate test was undertaken and that medical certification requirements were properly undertaken. Accordingly CASA is satisfied that it has made a decision that balances the safety of aviation against the privileges of the pilot.

It is not the case that CASA is seeking to "wind back" the Dennison decision. CASA has endeavoured to ensure that the regulatory requirements were satisfied in the interests of aviation safety, this being a position consistently adopted by CASA over the last two decades. CASA remains of the opinion that to permit a pilot with a severe colour vision deficiency to exercise the privileges of an ATPL would be contrary to the interests of aviation safety.

The aviation medicine field has long recognised the deficiencies in the existing testing methods such as lantern and other colour vision tests, and has funded research to improve testing methods over the last decade. CASA considers the creation of new aviation-specific tests (such as the CAD test) are better suited than the previously used practical tests for detecting colour vision deficiency due to their direct relevance to aviation specific tasks and aviation safety concepts. In the case of the CAD test it has also been developed through industry consultation and by reference to medical research methodologies which allow it to be validated as an appropriate and more sophisticated method of testing, providing both vocationally relevant information and a colour vision diagnosis.

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**Senator Fawcett asked:**

**Senator FAWCETT:** ... I will also be seeking further information about CASA's plans in terms of the adoption of the CAD test. I would also like an answer on notice on whether you will consider an equivalent to the audio test, an inflight or a simulator based test, for people who have a recognised CVD. I am sure the CAD test is an absolutely thorough, 100 per cent accurate test to prove that someone has a CVD. The critical question for industry and for individuals' careers is whether that has an impact on their ability to safely operate the aircraft. I look forward to your answer on notice as to whether you will adopt an approach that will give an equivalent avenue for those pilots with a practical test versus just the theoretical one.

**Answer:**

The present legislation does not make provision for testing of medical conditions other than by reference to the applicable medical standard and requires both Ishihara and Farnsworth testing prior to use of third level testing. By the use of the CAD test CASA is offering a third level of testing of all relevant coloured lights that simulates an operational situation.

CASA acknowledges that simulator or flying evaluations can be a useful means of assessing some types of reduced capacity involving some type of physical limitations such as restricted movement. However, where the medical standard is concerned with conditions involving limitations such as sensory perception (such as, for sight, visual fields, visual acuity and colour vision) a purely functional test by way of a flight test or simulator ride would not be able to confirm the scope of the restrictions nor interpret the responses of the subject. For instance, if the medical conditions relate to the visual fields, the test might not create a situation where the visual field is tested.

While simulator tests may be appropriate in some instances, CASA cannot ignore scientific empirical testing practices which have been developed and used internationally. Subjective testing through non medically verifiable means cannot be reconciled with the purpose and function of aviation medicine. While a functional test can be used as a means of *verifying the outcomes* of ground testing, it cannot be used instead of ground tests.

In the case of colour perception, the CAD test is a practical and verifiable ground test created using aviation colours relevant to both in-cockpit and out-of-cockpit colours. It offers information that is specific to aviation safety as well as a colour vision diagnosis and provides a thorough, repeatable and reliable test to determine a person's colour vision deficiencies. It also has the necessary requirement of consistency of approach as between candidates and removes what would be, at best, subjective assessment of a candidate in the context of either a flight or simulator test. The CAD test provides information on which to base appropriate, defensible and fair safety decisions.