FLIGHT SAFETY

SAMAA Safety Procedures – TX "Fail safe" and Frequency control

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This article was published in SAMAA News a good while ago and it is very obvious that not many pilots flying PCM receivers in their aircraft have taken any notice of this ruling. All pilots please note that the implications of an Insurance investigation into any accident that warrants a claim could be enormous and even more so if the fail-safe settings on your radio are not set up correctly.

Following the accident that caused the untimely death of young Adam Kirby in the United Kingdom and the subsequent legal investigation, the following recommendations have been published by the BMFA (British Model Flying Association). The SAMAA has no hesitation in forwarding them as safety rulings that must be applied by all modellers in South Africa. These are rulings put forward by SAMAA must be treated and enforced with urgency by all individuals and clubs concerned.

A bit of the background of the accident will not go amiss.

Adam was killed when he was hit by an FAI pattern aircraft that went into a failsafe condition just after takeoff. The cause of the equipment going into failsafe has not been determined but the likelihood of another transmitter on the same frequency, being switched on at the same time was a very strong possibility. The transmitter controlling the aircraft was PCM capable and was operating in PCM mode. It had not been programmed to maintain anything other than a "Failsafe Hold" condition on the detection of a problem or an interfering signal. The failsafe programming information was sent to the PCM receiver in the aircraft when the transmitter was switched on and updated at regular interval when the system was in use. This data was stored in the receiver memory.
On the receipt of the interference the receiver did exactly as it told to do and went into a "failsafe hold" mode. This means that it held the servos in the last commanded position.
The aircraft had taken off, the radio went into a failsafe condition, it climbed under full power, performed a flat wing over and hit Adam on its way down. Adam was standing beside his father just outside of the pit area and the impact killed him instantly. A shouted warning had gone unheard because another motor was being run up in the pit area at the time.
The inquiry noted that if the PCM radio had been programmed to stop or idle the motor on going into "failsafe" then the accident could well have been avoided.

“Failsafe Hold” is the factory default for most PCM radios and it would be a safe bet that 99% of all PCM radios in present use in South Africa and the rest of the flying world are flown under this default set up.

The SAMAA ruling to lessen the risk of a similar accident happening in South Africa is that: -

All PCM capable transmitters flying a PCM receiver in any POWERED aircraft must be programmed to BRING THE MOTOR TO A SLOW IDLE in the case of interference or other problems that may cause the receiver to go into “failsafe”.
This is the minimum condition. It would be preferable to STOP the motor completely.
The rest of the channels may be left in “failsafe hold”.
In the case of a F3B Glider then the Transmitter must be programmed to put the aircraft into a FULL CROW BRAKING condition.
Gliders without crow mixing but with airbrakes must extend the brakes.

If a pilot is not aware or is unsure of how to set up this programme on a PCM transmitter, then he should seek the help of someone who does. Equipment importers and dealers can be of assistance here. Most the manuals prepared by the manufacturers for their radios are very clear on the setup of the “failsafe” positions of the various channels.
The failsafe being built into modern radio sets is to enable the aircraft to crash safely if the equipment on board picks up an interfering signal or another problem. It is not designed to protect the aircraft.

The correct failsafe setup can be tested before flight in the following manner.

a) Make sure the aircraft is suitably restrained by a helper or helpers
b) With the correct method of frequency control in place, switch on the transmitter and then the receiver
c) Check for correct operation of all the major controls
d) Start the motor and allow it to warm up.
e) Leave the motor running at a reasonable fast speed and switch off the transmitter.
f) After approximately one second the throttle servo should move to beyond the slow position and idle or kill the motor.

FREQUENCY CONTROL

The inquiry also examined closely the method of frequency control in use at the time of the accident, plus the other methods that could have been used and came to the conclusion that there are flaws in most of them and stricter control of all systems must be implemented.
These systems are utilised worldwide and are supposed to be as near foolproof as possible, but as I and many other modellers around the country have found out it, is not always the case. A good few accidents have occurred thankfully without the terrible consequences related above. Modellers get very blasé about frequency control methods and it seems that as long as they are not likely to lose an aircraft then they work on the "it can't happen to me " syndrome.

When it comes to effective and safe frequency control all model pilots, whether they be appointed Safety Officers, members of the club committee, or just plain members should always consider themselves to be Safety Officers, and all pilots must adhere to the standard SAMAA method of frequency identification on their transmitters.

It is vital for club committees and all members not to tolerate members who think they know better and do not follow the rules. The need for constant vigilance will still go a long way to preventing accidents. We have many shortcomings in our methods of frequency control that need redressing with extreme urgency.

The SAMAA recommended methods for use in South Africa are the (Red)"PEG OFF" or the (Blue) "PEG ON" the board systems. Whichever system is in use it should be mandated in the clubs flying site rules and a larger notice explaining the system should be appended to the frequency board.
The "PEG OFF" the board system places the onus on the club to provide a board and identifying pegs that are removed from the board by the pilot when he wants to use a particular frequency.
The psychological effect of having the peg in hand and being in control of the frequency is quite strong. The peg is put back on the board when the pilot has finished his flight. The system works quite well but it is not infallible. It has happened that a pilot takes a peg home after a flying session. There is also a bit of a built in safety system in that a frequency without a peg should not be used. Other pilots may want to use the frequency spot with the missing peg and the safety officer/committee member present at the time may issue a temporary peg to allow flying to continue. What happens now if the pilot that "borrowed" the peg in the first place now arrives and wants to fly and doesn't do a thorough check of the frequency board? It shouldn't be a problem. He has the correct peg after all. There

is now a situation where there are two pegs for one spot and unless someone is very aware of what is going on, it is an instant recipe for a disaster. Another problem with this system is that it is very difficult to identify who is using which frequency at any one time. One way of ensuring that the frequency pegs are not “borrowed” is to make then rather larger, heavier and more ungainly. The requirement that pegs need to be put onto transmitters must fall away if they are too large, but there is no problem with pilots clipping them to their clothing etc. as long as they are returned to the peg board after the flying session.

The SAMAA ruling for clubs using the “PEG OFF” the board system is as follows: -

All pilots and visiting pilots must be issued with a key ring nametag, with the pilots name and frequency marked on it, that is to be placed onto/into the same position on the frequency board as the proper frequency peg when it is removed for flight. This key ring nametag must be of a completely different design to the frequency peg that is being removed and if used correctly will always give an indication of who is using the frequency and identify the culprit should a peg not be returned. The system must not be abused and allow incorrect identification tags to be utilised.

The second method of control is the “PEG ON” the board system. Here the onus is placed on the pilot to place his own frequency peg on the correct position on the frequency board. This system is preferred by many clubs in South Africa that do not have secure clubhouse facilities because it leaves very little equipment behind to get stolen. This system also negates the need for the club to provide frequency pegs and overcomes the problem of pegs being “borrowed” after a flying session. The psychological aspect here is not as strong as previously stated because the pilot does not feel he has complete control of the frequency he is using. What happens too if the pilot wishing to fly does not have the correct type frequency peg? There have been cases of battery packs, bunches of keys, and even bits of paper hung onto frequency boards to denote frequencies in use. The problem now arises when a bit of paper gets blown away, or a bunch of keys fall off and someone else then puts his peg on the now vacant slot.
Again we have a situation with two or maybe more pegs for one frequency. It can be difficult to identify which individual is using which frequency under these conditions too.

The SAMAA ruling for clubs using the “PEG ON” the board system is as follows: -

The Safety Officer/Committee members/ or any responsible club members must make sure that only the correctly identified pegs are put onto the frequency board. No odd identifiers are allowed at any time. The pegs must have the pilots name and frequency clearly marked on them. Pilots without the correct peg must not be allowed to abuse this system to fly.

The SAMAA basic rules have been formulated over a long period of time and every now and again an update is required. In the case just related it has unfortunately taken the death of a young aspiring pilot to force home how important the implementation of a well run and strictly enforced frequency control system is.

Obey the Fail Safe and Frequency Control Rules and don’t let this or any sort of frequency related accidents happen in South Africa.