

Will the radio installation affect reliability?

by Stephen Green

You bet it does. Radios available on the market today do a fantastic job and they seem to cope with installations you would not even dream of doing thirty years ago. There are two parts to an installation. The first is to give the gear the best possible environment to work in and the second is protecting it during a crash.

Radios can survive crashes, I can vouch for that as I have certainly stuck plenty in over the years. After a hard impact get the radio checked by the importer or at least some one who specialises as a radio control technician. A landing accident or cartwheel on take off is a low speed accident and not too hard on the gear but if it thunders in at full throttle, get your gear checked.

The radio could be working perfectly except a small tooth on a servo gear may be stripped and not show itself until under load, in flight. Most crashes are caused by pilot error and next is the inability of the radio to cope with it's environment. You can also have a radio that works perfectly and after you thumb a plane in start having problems that were caused by a malfunction due to previous crash damage.

As a kid I got to see a lot of radios that had been smashed up and repaired. If a radio was suspect or if it returned faulty after a recent service or repair I used to screw the gear into a plane and we would go out and fly it. There were a few customers who always seemed to have trouble, even the ones who were good pilots. Remember that saying "the more things



No room for crash protection in small electric models. Ensure the antenna is not near any wiring.

change the more they stay the same." It was interesting to see a clause in an old R/C manual that stated "Our experience over the years indicates that improper equipment installation is the single greatest cause for modellers encountering difficulty with their radio control system."

Creating you own internal interference is the first thing to watch out for. Avoid metal to metal contact from the throttle and nose gear steering arms. If the throttle arm is metal and a metal kwiklink is connected, vibration causes these items to generate interference. If the throttle arm is metal use a nylon kwiklink. If the control horns are metal use a nylon kwiklink. A big no-no is the antenna wrapped around the servo wires. There the potential is for the receiver to pick up interference from the servo wires.

When you turn on to base leg during a landing approach the aircraft is a long way out and low and usually slow. The signal from the transmitter is usually weak at this point and momentary loss of control causes an accident at this point. The model does not respond and a natural reaction to pull the nose up is often applied. Radio control then resumes and there is suddenly a large nose up command which stalls the aeroplane.

The model crashes and the pilot says "I had nothing." A lot of aircraft have been crashed this way and the radio usually gets the blame.

The transmitter antenna had to be held high to ensure the strongest signal. Pointing the TX antenna towards the ground because it is more comfortable was an absolute no-no once. You could not even contemplate running the RX antenna inside the fuselage where as today you can in most aircraft.. Whilst on that subject always fit an internal strain relief to provide support where it exits the fuselage. Without one, the load is taken at the circuit board where you can't see it. Have you ever accidentally pulled the antenna when moving the model? A servo arm provides a cheap almost free strain relief.

The battery pack and receiver should be protected from vibration, shock and fuel. Vibration and shock protection is easily achieved by making a rubber box that wraps around each unit separately. Glue it together with contact cement and put rubber at each end. Put it in a plastic bag and that's done. Vibration and shock are different.

The typical yellow or green/blue foam plastic is okay for vibration but offers very little impact protection, in fact there is hardly any. When a plane crashes at high speed little things that you never see can happen to these vital components. The receiver can twist and the circuit board can



Metal to plastic is okay. The OS40LA no longer has a throttle stop. Back plate on the spinner helps reduce vibration.

fracture creating bad solder joints, leading to intermittent operation. Radios used to have metal cased receivers to help prevent this happening. Ask any radio technician if they enjoy telling the customer the intermittent fault could not be traced.

Back then at least you could see a soldered joint and in a hard stack resistors and capacitors etc. all bent forward because of the massive de-acceleration. Today you almost need a microscope to look at a circuit board. If there is room wrap each of the radio installation compo-



A short pushrod is recommended for high speed aircraft. This modern system is far superior to bellcranks, nyrods or cables.

nents separately rather than placing them in a box built into the airframe because in an accident each unit has it's own protection if it gets flung out.

Fuel leaks just seem to happen from time to time. An old fuel line splitting is a common cause and fuel can drip onto the battery if it is placed underneath the tank. A pressurised fuel system can splatter fuel right through the airframe and if that happens in flight it could cause a crash. A plastic bag around both the RX and battery is a wise precaution.

Balsa wood pushrods are preferable to

dowel or arrowshaft as they are lighter. Light weight makes them less prone to whipping up and down with vibration. This would help make the servo pots last longer. In a crash the servo gears are less likely to strip with light pushrods, another advantage that still applies today. When mounting servos it is important to make sure only the rubber grommets are touching the mounting rails or tray.

By the way the brass ferrules that are supplied should be installed with the flange touching the servo rail and the screws should be nipped up lightly, don't overtighten them. If your servos have metal gears the output screws are probably metal threads. It pays to keep an eye on them as normal vibration can make the output screws unwind a lot quicker than the standard self taper into a nylon gear output shaft.

Batteries have caused a few problems over the years. Did it go flat because of too many flights or was it not charged correctly. A poor installation is often an underlying cause of excess battery drain. The biggest culprit is the throttle linkage, in particular the throttle stop. The practise of setting the lowest idle speed with the throttle stop isn't required today as most servos centre accurately enough for this task. Did you know if a servo stalls as it pulls against the stop it can draw up to 600 mah. If your system has a 600mAh battery pack that servo alone will exhaust the supply in one hour.

Okay the engine doesn't idle for an hour but if you factor in power consumption for running the radio plus flight loads, about four flights can be enough for the system to shut down. Consult Murphy's Law to figure out if this will happen to you on the ground or in the air. If the servo rails are not parallel the case can distort if you overtighten the screws. This can make the gear train bind slightly increasing the current drain. Hinges that are stiff and pushrods that bind also increase the load and all this



Yes it is okay to tie a knot and let the antenna trail in the breeze. Remember if it is too long don't cut it off.

stuff adds up.

Five eight minute aerobatic flights was a good day out in the seventies and today a modern four channel radio can do a dozen ten minute flights provided the installation is good.

The last thing to watch is make sure the wiring is not tight. Vibration has a way of slowly getting plugs under tension to part company. When you install the wing ensure the aileron lead is not hooked up on the servos in the fuselage. A simple thing like this could mean you may have to learn to land without ailerons. Plenty of pilots have coped with this problem before but it does get hard if the ailerons stop on one side and not in the centre. All of these little things have been learned over time the hard way. One day if you make a wrong turn and get blown a long way downwind the difference between getting back or crashing can be the quality of environment the radio has to cope with. That difference is often determined by the installation.

When purchasing a radio system today you may be able to choose between a PCM and PPM. The PCM system offers far superior protection against interference because you can decide if you want the radio to ignore the problem before the fail safe system activates.

Although you are more likely to get away with a poor installation using PCM, one day when turning on to base leg a long way out, low and slow for some reason the receiver kicks into fail-safe. The controls have been programmed to hold for a half a second so the aeroplane keeps rolling from a gentle to a steep bank. By then you will have applied a lot of up elevator to stop the descent that should not be happening. The system trips out of fail safe and nose rises to the up elevator command. The aeroplane either stalls or will not roll out due to slow aileron response (too slow) and in it goes. When asked what happened you reply "I don't know there wasn't any control" That was a crash was caused by a poor installation and if the radio was not properly protected it may be the start of a few more ●

Products for modellers made in Australia



Quality, rugged, reliable, servicable air retracts in two sizes. The smaller is low profile to fit those thinner wings. The cylinders can be reversed on the larger set. All spare parts are available. Retracts, with all fittings
 MAS 5000 Trike set \$430
 MAS 5300 Main gear set \$330
 MAS Large POA



Shut off valves for fuel.
\$90



Air rams in different stroke lengths.

Electronic Model Products

- Retract door Sequencer \$69.95
- Servo Slow \$69.95
- Electronic Switch to replace the standard switch harness. \$69.95
- Volt Logger battery monitor, glitch detector \$85
- Two Channel Mixer \$69.95
- B Switch is an auxiliary battery switch \$69.95
- Single Servo Reversing Module \$49.95



Nose Legs \$94

Model Aircraft Services

1/91 Wanneroo Road Tuart Hill W.A. 6060.
 Phone 0 8 9344 4300 Fax: 08 9207 1284
 EMAIL: darren@mas.net.au. Web-Site www.mas.net.au
 Trade enquiries invited.



For sale
 Brand new professionally built Pilot 1/4 scale Tiger Moth. Covered in Solatex and ready to fly. \$1500
 Just add engine and radio.

Call Charles on 03 9735 3466

Get the latest copy of RCM News delivered on time to your door. Free postage and you save money. A six issue subscription is just \$35.00