

P&M Aviation[®]

▶▶▶ Summer 2017 Newsletter



- ▶ Flying to France
- ▶ The Joy of Flex
- ▶ Training in QuikR

Chairman's Chunterings

Tackling the cable issue



I am sure that I am not the only one to wonder where the summer has gone, as time has simply flown by. Here at the factory, the last few months have been dominated by *Service Bulletin 147* and the huge focus and effort to ensure the supply of replacement cables and fasteners as fast as we can. This has also entailed intensive working with the BMAA and CAA. While this is, understandably, seen as an unwanted additional cost for owners, I think we can say that it has caught at least one set of dangerous cables that would have led to failure at some point.

The majority of owners' concerns would appear to be regarding the seven-year calendar life. While this is fully understood, the CAA, quite rightly, is looking for more empirical evidence before making any changes to this limitation. Thus, the onus is now on inspecting and testing returned cables so that a solid body of evidence is built up and presented to the CAA with strong recommendations on your behalf. To achieve this, owners must return original cables to us for investigation, once they have been replaced with new cables.

Please also note that fitting instructions are now in the manuals section of the download part of the website. All documents relevant to this service bulletin will be entitled *SB147 – xxxxxxx* to make it easier for people to find them.

We continue to work on product improvements, particularly in the area of instrumentation and wiring, and we will be providing more details in due course.

Away from the factory, a highlight for me in June was flying with Bill, in the HypeR, from Marlborough to Pizay near Lyon, to demo the aircraft at a French flexwing fly in. The welcome they gave us was simply superb and the response

to HypeR was excellent. On the way back we ended up being hosted at St Omer by the Flying For Freedom team, a great way to end a perfect weekend. More of that in the next newsletter.

Following requests for branded clothing, as you can see from the photo on this page, we can now do sweatshirts, fleeces and polo shirts with different aircraft type logos, with a rather nice patriotic wing scheme as shown.

Wishing you all safe flying.



Branded clothing now available to suit a variety of P&M machines

CONTENTS

▶ Flying to France	4
▶ The Joy of Flex	11
▶ QuikR: Training Machine	14
▶ Tumbling Dice	18
▶ Canada Snapshots	21
▶ To Fuel or Not to Fuel	22

P&M chief designer Bill Brooks test flying a PulsR destined for Mexico, from the company airstrip at Manton

COVER PHOTO by Richard Hudon, of Patrick Lemay flying cross-country in Canada (see also p21)



“Not Very Styleesh” formation heads for France

French ATC were less than impressed with **Gordon & Jill Douglas’** motley crew of low-hours aviators. But there’s no substitute for experience, as Jill explains

Air Traffic Control, Le Touquet : “This formation is not very styleesh... One of you is on the ground, one of you is downwind, one of you is still at Boulogne, speaking to Lille! This is *not* a formation! Not styleesh, not at all styleesh!”

And that was our welcome to France, having landed there without criticism for many years. Such was our introduction to touring with a

bunch of newbies... having been briefed to fly in a tight formation, the minute we changed over to Le Touquet information it all went to pot and everyone drifted away and did their own thing. Not good form, not good at all!

In fact, once everyone had (eventually) landed and secured their aircraft, I had to administer some discipline. Five bottoms were lined up (Peter was exempt as he flew separately) and a small

amount of thrashing was given out. At which point a fuel truck arrived bearing a black package. “Has someone lost something on the runway...?” “Bloody hell, Geoff – that’s your wing cover!”

Scarily, it had bounced out on landing. Better there than over the Channel, but only a little better. Our shame and mortification complete, we headed into Le Touquet to drink our troubles away.

“Do you think we’ve done the right thing, Gordon, bringing this crowd of incompetents with us to the land which has always made us so welcome in the past? How will we show our faces at our favourite airfields with this motley crew?”

But after a good dressing down and much beer and wine, things were looking rosier and we set off south the next day in the hope that airmanship and communication might improve with fewer stressful situations to deal with.

Thankfully, it did...

Having made exploratory trips to France and Italy for the previous few years, and having cut our tour-leading teeth the previous summer with a couple of unsuspecting victims, we decided to put these skills to a serious test by leading a group of four other aircraft (six people, plus Gordon and me) to the Pyrenees and (hopefully) back to East Fortune.

Our little brood consisted of four QuikRs and one GT450 piloted by Peter, who had been to France before and who agreed to fly separately to save us having to slow down for him – he would meet up with us at all stops along the way.

All the pilots had trained with us in GT450s and QuikRs and one of their main goals had been to use their fabulous aircraft to visit pastures new and drink French wine (and the odd beer).

Planning began in earnest with everyone deciding what their priorities were. Geoff wanted to fly to the Pyrenees to see his sister. Gordon and I wanted to revisit the beautiful Ile d’Yeu, off the west coast of France close to La Rochelle. We’d had a lovely few days there a couple of years before and wanted to share that experience.

But mainly we all just wanted to experience that fantastic welcome the French give to fellow aviators.

I handed out my “Touring Check List” of things to take – it is a personal and detailed breakdown of every item we take, and has been honed by years of experience. Peter declined my suggested “bra for



each day” and Mat declined the suggested number of T-shirts. He took two – one white and one grey. And a tube of travel-wash. We became accustomed to seeing Mat’s “other” t-shirt dangling from balconies, airframe parts, trees... ▶

Above, from top QuikRs ready for departure to France; Martin safely into Le Touquet; and Ile d’Yeu

Facing page Martin getting ready to depart Peyresourde



▶ He was flying with Neil and they had had to pare down their luggage dramatically to get under the weight allowance. While Gordon and I can take double Ryanair's allowance, Neil and Mat were lucky to be able to take hand-luggage. Fewer pies and beers before the next trip, eh lads?

A local hotelier managed to find us rooms for the night. So lucky! And he had a beer garden. And it was hot and sunny and we were thirsty. What to do...?

Still, beer and pies (or rather just beer) became the theme of our trip. No beer allowed at our first stop of Sherburn, but the first night at Sywell saw a decent quantity of the stuff consumed, with everyone very excited/nervous at the prospect of crossing the Channel the following day.

That day dawned with clear skies and light winds and, after a good briefing about heights, radio, formation-flying etc, we got airborne. The Channel crossing was straightforward and our

squadron's radio calls to London Information and then (scarily – first French accents!) Lille Information seemed to be going well. Until Le Touquet that is. Oh the shame!

Never mind – we'd made it this far and couldn't turn back now. We headed south from Le Touquet to Bagnoles de l'Orne, where a local hotelier happened to be drinking at the airfield bar and managed to find us rooms in his hotel for the night. So lucky! And he had a beer garden. And it was hot and sunny and we were thirsty. What to do? So we did. With Mat's white T-shirt dangling from the balcony of his room...

Bagnoles is a lovely spa town, with a lake and many restaurants, and is highly recommended for those touring France. The town is within walking distance (well, quite a long walk) but on this occasion our friendly hotelier gave us lifts.

From Bagnoles we headed south and west to the Ile d'Yeu. A truly beautiful flight, ending with the sea crossing over to the island, and Martin discovering on the way that he had some sort of engine problem. Everyone landed safely and Gordon had a look at Martin's engine, could see nothing wrong and took it for a quick flight.



All was well. What could have been the matter? An embarrassed Martin had a think and decided that he must have flown from Bagnoles with only one magneto on. Mr "Careful" Martin? Really? Neil was thrilled. "One Mag Marcel" he insisted on calling Martin for the rest of the trip (and still does, occasionally).

Martin absolutely came into his own on the Ile d'Yeu, however. We had brought camping gear (most of it stowed inside the wing) but hoped not to have to use it and so far this had been the case. The Ile d'Yeu is a very popular holiday destination for the French, and this was a holiday weekend. Not only could we not find any accommodation for eight people, we couldn't find transport into the local town. There are only two taxi firms on the island and neither was working that day.

What to do? I had exhausted my French and my scant knowledge of the island transport, but Martin, ever resourceful and with limited French, managed to make arrangements! It is "de rigueur" to hire bicycles on the island – they are a brilliant way to see the place and Gordon and I had hired them on our previous visit. Martin (with support from Gordon, his co-pilot) managed to blag a firm



to bring eight bikes to the airfield, offload them and replace them with all our luggage and camping gear.

We waved the van away, hoping like hell that we would see it again at the campsite. Off we set, stopping en route to find one room for the two confirmed non-campers in the group (Neil and

Facing page Martin heading for the Pyrenees
This page Refuelling at La Rochelle (top) and cycling on Ile d'Yeu (below)

▶ Geoff) and agreed to meet for... you guessed it... beer.

French campsites have a well-deserved good reputation and we managed to pitch our tents in a line with some good hedge protection against any winds. The site also had a bar – seemed a shame not to try it. After a couple of beers and some *frites* we wobbled our way across sandy beaches and down little lanes lined with perfect white cottages and hollyhocks waving in every garden, and so into town for more of the amber nectar and some delicious seafood in a harbourfront restaurant. Heaven!

The weather so far had been amazing – sunny skies, tailwinds where there was any wind to speak of, and deliciously warm temperatures (especially

Gordon led the way in to Peyresourde and we watched heart in mouth as our little flock of chickens landed safely one at a time on this tricky runway. Phew!

for us Scots). But that night it rained. Typical! We'd brought our pop-up tent (single skin) and worried that we might get a soaking, but I can't actually remember if we did or not. Something to do with the beer I think.

Next day dawned bright and lovely again and we cycled back to the airfield. Our friendly bike-hire company met us there with our bags and our aircraft were all safely waiting for us, secured with Gordon's tie-down design which basically renders them just about impervious to wind and makes for a good night's sleep in the knowledge that they will still be there the next day.

Off we went, this time flying south to Montpezat, a haven for those with a Rotax engine as Philippe Boucherat has a well-equipped workshop there. He runs an excellent flying school (flexwing and fixed-wing) and has mogas on tap. There's also a fantastic restaurant, with rose garden – a little slice of microlight heaven.

Philippe was very kind, organising chalets at a local holiday complex, running us over there to dump our stuff and bringing us back to his restaurant where, even though his daughter was getting married there (yes, really!), he fitted us in

with a corner table away from the wedding guests. Such amazing hospitality.

The following day we headed to the Pyrenees for the boys to try their first-ever altiport landing. Geoff declined to come with us, instead opting to fly to a strip near his sister's house, where he was fed, watered and swam in her pool. His dream had come true and he decided that this was the zenith of his flying career.

The rest of us had a stunning flight over the Pyrenees to land at Peyresourde, which Gordon and I (and Peter, separately) had flown into previously. It is a fairly steep runway and not a little daunting as you are coming in, flying the particular circuit pattern that must be adopted for altiports as there is very limited visibility when you are at the top of the runway – you can't see what's on it!

Gordon led the way in and we watched (me with my heart in my mouth) as our little flock of chickens approached, one at a time landing safely on this tricky runway. Phew!

Exuberant with their achievements (survival!) they headed for the only café in town, with superb views over the mountains. Peyresourde is a ski resort, so there's really nothing doing in summer. It looks quite bizarre in fact, a concrete village perched on the side of a mountain. Fine in the snow, but frankly a bit weird at this time of year.

The coffee and pastries were enjoyed and we noticed that they also made pizza. What a great idea for our evening meal back at the chalets! We purchased eight and Peter agreed to strap them into his back seat. The take off, though a little heart-in-mouth as you hurtle downwards towards nothing, was fine and we headed to the very pretty Pyrenees town of Bagnères-de-Luchon, another spa town with probably the most beautiful airfield we've ever seen, nestled within the mountains and beside a river. It is a green haven of loveliness.

In the town we ate a delicious lunch and bought some wine to take back with us, Peter's back seat doing sterling service once again.

The locals at Luchon had warned us that there was a strong wind blowing outside of the mountains and we were eager to get back to Montpezat. Gordon assured us that we would all have enough fuel and everyone believed him. ▶

Facing page Safe landings at Peyresourde altiport (top) and departing later that afternoon (below)





By now, our 'Not Very Styleesh' formation was a slick, well-oiled machine. Our flying groupings would bring a tear to a glass eye, they were so smart

▶ Wrong! On our way back, Neil questioned the readings from his fuel tank and Gordon assured him again that he would be fine. If Neil's engine stopped, however, Gordon would lead him down into a suitable field and all would be well.

It was a tense half hour, field-spotting like there was no tomorrow, and wondering how Philippe would react when we asked him to drive 30 miles with some cans of fuel. The engines kept on going though, and we landed safely at Montpezat with a few litres still in the tanks. Gordon had been right all along.

Peter had opted not to fly back with us, but to go off on a wee tour of his own. So we waited, getting more concerned by the minute (he did have the wine and pizzas on board, after all) until we heard Peter's call on the radio that he was inbound,

coming in on fumes. He filled up with mogas – 62.38 litres. He had just over 2 litres left. That was a close one.

From there we headed north again, dropping in on Dave and Amanda Lord (and James Walker) at Wanaflly, where Mat nearly landed in the potato field. And at L'Aigle where Geoff nearly crashed as he was so tired, thinking we were landing for the night at Le Mans. Onwards to our favourite overnight at St Omer and back over the Channel to some proper British weather – strong winds at Sywell.

By now, our "Not Very Styleesh" formation was a slick, well-oiled machine of formation-ness. Radio calls sounded more professional than the professionals (yes really, some of them) and the flying groupings would, as Gordon says, bring a tear to a glass eye, they were so smart.

Back at East Fortune, without incident or accident, we felt very proud of our little brood, who had learned so much, had so much fun – and drunk so much beer.

Here's to the next time. Cheers! ■

Above Lunch at Luchon



The joy of flex

Ian Nash rediscovers the joy of true freedom of flight, thanks to flexwing microlights

I have enjoyed flying all sorts of models and subsequently full-size aircraft since childhood and seem to be showing no signs of growing out of it, despite being seriously over 21.

If asked why, I think it's because aloft is a special place, free of the ground and its limitations, with endless possibilities and new challenges. It is exciting and stimulating and I always land refreshed, recharged and with a smile on

Photo Ian's favourite flexwing: the Quik Lite



▶ my face (and on the odd wild day occasionally a sense a relief!). To keep the experience like this I have engaged with various forms of flying over the years to widen my experience, learn new things and obtain a more complete view of the wonderful world of aviation.

This has included gliding (including instructing and tugging) as well as light aircraft, with my current aircraft being an open-cockpit aerobatic biplane. I currently count 200 types from 100 different locations and 2000h. This has inevitably lead to some increased complexity

and it has seemed of late that something simpler may be a bit of fun, so I tried a flight in a flexwing – and what a revelation it was!

I was lucky enough to get a flight in P&M Aviation's new HypeR demonstrator which in one flight dispelled a number of microlight myths. It also gave me an unparalleled feeling of the freedom of flight, with stunning views that put a huge smile on my face.

It was a direct, almost raw experience but beautifully and accurately controlled with just a simple bar to hold – a little like the difference between riding a motorcycle and driving a car.

The quality, performance and capability of these machines are nothing like the original microlights I remember from years ago. The HypeR has the same cruise speed as my biplane

(on half the fuel – unleaded not avgas), better duration and far more luggage space. A serious touring machine in fact.

A subsequent chat with some local pilots also reminded me of the great camaraderie (again like motorcycles) in the microlight community, with stories of trips and shared adventures of flying these aircraft in small groups into fields, camping as well as touring in both the UK and Europe. Clearly, this was a whole new world within aviation to explore, it had to be done!

To my delight I discovered I only needed a few hours at my local flexwing school (Clear Prop) to convert on my existing three-axis licence. This was done as difference training on the school's Quantum 912.

Since then, although I am still low hours on this breed of aircraft, I have been lucky

enough to fly a number of flexwings – my favourite being the lightweight, wonderful handling, Quik Lite with its two-stroke 582 purring away like a little turbine. I cannot think of a more direct experience of feeling you are flying than this, not to mention the freedom and liberation of being able to operate from almost anywhere.

Moreover, the cost of a flexwing is still far less than their fixed-wing counterparts of similar performance like the Eurostar, remarkable given they are built to the same standards (BCAR Section S), using the same materials and same engines. Operating costs are also much

lower than my biplane, for example, and the airframes are much more accessible for maintenance, so much so that I am looking at getting a share in one as a second aircraft.

A recent example that highlighted this to me was the cost of a re-cover – months of work and £25k for the biplane, versus £5k and about an hour for a flexwing!

Flexwings will not replace aerobatics in the biplane, but that's not the point. What they do give is access to a whole new fun-focused form of flying. Something new, different, exciting and challenging – and I for one am up for it! ■

Above Light years away from early microlights, the PulsR (left) and HypeR (right) are serious aircraft in their own right

Facing page The author's aerobatic TSW2 (top); and Ian gained much of his early flying experience on gliders (below)



QuikR: Excellent trainer or X-country thoroughbred?

Although a high-performance flexwing like the QuikR isn't the obvious choice for a training machine, a number of schools have nevertheless adopted it with great success. Here are the experiences of two instructors, operating on opposite sides of the world and in very different conditions

Gordon Douglas
East Fortune, Scotland

Occasionally I will get raised eyebrows when telling someone that we use QuikRs for training at our school at East Fortune. The fact is, it works very well. For anyone who doesn't know our part of the airfield at East Fortune, we have a main runway 29/11 (300m concrete + 150m grass), and 25/07 (250m grass), plus a very short 21 (150m grass, slightly uphill for strong southerlies).

Having tried various circuit patterns and sizes over the years, the only one which keeps most of our neighbours happy is a very tight one at 500ft. Twenty years ago, when we were all flying Flash 1s and Flash 2 Alphas, the low speeds were fine for this. Now, with the higher flying speed, it takes a bit more precision to fly the circuit well.

Circuits, by their nature, create a high workload, especially if done in a short space of time. We trim the plane to 65mph hands off and leave the trimmer there – one less thing for students to worry about. We don't look for a perfect performance straight out of the bag, but gradually introduce more aspects as the student becomes familiar with the exercise.

The main challenge is to teach the student to manage the airspeed correctly, which means levelling off accurately and reducing the power sufficiently so that they are not left trying to hold the nose down with the bar and charging round the circuit at 90mph! A bit more time during the upper-air work exercises helps to get this right.

Again, in the old days, students were just taught to pull the bar in and keep the speed up on approaches. Now, if we do this, we'll be coming in at 90mph again and rapidly running out of runway during the hold off. We have to teach the student

that managing the airspeed is vital, initial aiming point achieved at the correct airspeed etc, a lot more like the Group A world.

It doesn't actually take too long for a new student to master this. It sometimes takes longer for a Pegasus XL generation pilot to unlearn his landing habits and adapt.

The great advantage of training on a high-performance machine like the QuikR is that it opens up a much bigger weather window for us. Over the years, the Scottish climate has definitely got windier. I think that if we only had Flash 2 Alphas to train on now, we would have been weathered out and no longer in business. To be able to fly and handle windier and bumpier conditions means much more hands-on time for students, and at the end of the day, they are more competent pilots with a wider range of experience.

The accident statistics bear witness to this. In the good old days, bent landing gear and occasional ▶

Above Having learned on a quick machine, students often get a taste for touring. This is Martin Naylor in France in 2015



Mathew Greave congratulated on his first solo

tip overs were not uncommon. Now, it is hardly heard of. Yes, the equipment is stronger, but the piloting skills are much better also.

We're not putting Alphas and XLs and Qs down – they're great fun to fly and perfect for the lower budget students. But we're finding that students who train on the higher performance machines tend to want to own or share a similar machine. They see the trips that we do in our school machines and it encourages them to want to do the same. It's a good way to continue with their learning instead of "OK I've got my licence, what now?" They are confident to fly into GA airfields and mix it with the rest.

Let's face it, if they can fly the circuit and land at East Fortune in a QuikR, they can land anywhere!

And the icing on the cake? I can use my training aircraft to do some serious touring at cracking speed, and still hang on to a couple of world speed records too!

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Peter & Anne McLean Yarrowonga, Australia

AFTER flying and training in most of the trikes available in Australia today, I have come to one conclusion, and my students vote with their feet. I have more students wanting to fly the QuikR than any other type of aircraft I have owned or trained in.

So why is the QuikR so popular with the students? It's very simple: the QuikR is a nice looking aircraft and it has a safety record second to none, not to mention that the QuikR is very easy to fly with the STARS (Stability Trim And Roll System) taking the hard work out of flying. However, in saying that the QuikR is easy to fly, you still need to do the hard yards with the training if you have never flown before.

To fly, the QuikR is more like a standard three-axis aircraft than a trike. Students adapt more quickly to flying the QuikR, due to its speed, range, and stability, especially in the circuit and landing phases. My students often tend to solo quicker and also move through the training syllabus easier, due to the flight parameters of the QuikR.

The cockpit is just what you need for a training aircraft, with easy-to-see instruments in an angled panel – just right. On top of the instrument panel is the perfect space to put your charts, gloves, or just anything you need to store for use in flight.

So how good is the QuikR for the instructor? Sitting in the rear seat for hours on end is the hardest part for any instructor, and I have really only had two aircraft that made it easy for me as an instructor. They are the Tanarg and the QuikR.

On the QuikR it is very easy for the instructor to reach the cutoff switches, electric trim, hand throttle and choke. The training bars are also in just the right position. Also, the windscreen design is spot on because it minimises the wind on the instructor in the rear.

So for me, as the aircraft owner, how does the QuikR stand up to the hard work of being a training aircraft? Of all the trikes I have used for training, the QuikR has got to be the most cost-effective of all. For instance, after flying over 400h and making over 700 landings, the tyres still look like new.

On some trainers we have had res wear out



within 50h, while others have had brake problems, all things which are not only expensive to repair but also time-consuming. The QuikR, by contrast, has not generated any of these problems and is also one of the easiest aircraft to work on and maintain, making it a truly economic training machine.

So how is the QuikR as a cross-country aircraft? Fantastic! – because of its speed range. It can cruise at 70-80kt all day, allowing you to really go places, and fast. It is not uncommon for me to fly a navigation flight at 90kt. It's quite funny when we pass a Cessna – yes, after landing we do get comments from other pilots.

It's also very cost effective for students doing their navigation training, as they can make a longer flight and get to more aerodromes for circuits on different types of runways, as well as flying over more different types of terrain. The student can plan a real navigation flight and know that he or she can make it back on a tank of fuel, instead of just doing a small flight around the local area and calling it a navigation flight.

It's not unusual for our students to plan a flight covering three or four different aerodromes and flying over 150nm. The weather is also less of a problem due to the aircraft's speed and stability.

At the end of the day, most of our students



QuikRs earning their keep at Yarrowonga (top); and after going solo on a Quik, a student pauses for some appropriate refreshment (above)

have made their own decision, only to fly the QuikR. For Anne and I at Yarrowonga Flight Training, it's not just a great aircraft to fly in general, it's a cost-effective trainer as well.

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TUMBLING DICE

Dr Bill Brooks, technical director of P&M Aviation, discusses the phenomenon of tumbling

Over the years there have been too many tumbling accidents to flexwings, due to mishandled stall and recovery exercises as well as failed intentional aerobatics. The most recent was to a Pegasus Quantum earlier this year in the UK.

Tumbling is an aerodynamic autorotation in the pitch axis driven by the unsteady aerodynamic pitching moments which exceed the available pitch damping. Like spinning, the energy to sustain the motion is provided by falling through the air. Unlike spinning, the motion is generally unrecoverable: huge forces and moments are produced between the wing and trike, resulting in the breakup of the structure. Fortunately, with proper training and appreciation of the flight limitations, it is most unlikely to be entered inadvertently.

The Pegasus Quantum has a long control frame with the propeller operating below the wing keel. Given the fixed movement the pilot can apply in pitch and the length of the control frame, the angle of attack range is restricted. The pitch control forces for the pilot are

relatively light due to the long lever arm.

The Quantum will not stall if the control bar is gradually pushed out and held against the front strut – the aircraft will continue to fly at a high angle of attack in a pre-stall mush at around 30mph. It also will not drop a wing. The angle of attack is restricted by the control frame/front strut geometry.

In order to generate a true aerodynamic stall, it is necessary to accelerate the entry by pushing out on the bar more quickly. A mildly accelerated stall entry will demonstrate a stall break, from which recovery is simply a case of allowing the control bar in slightly, at which point the wing will resume normal flight.

However it is possible to go too far. The entry speed to the manoeuvre and the rate at which the bar is pushed out dictate the attitude and angle of attack the wing will reach. A high entry speed and strong push-out will produce a steep nose-up attitude.

The other way to develop a steep nose-up attitude is by using power. Applying full power at a low airspeed results

in a steep climb. If the power is suddenly cut, intentionally or due to engine failure, a sharp nose drop will result.

Recovery from a steep nose-up attitude at low airspeed does not require the control bar to be brought back very much at all. *Pulling the bar sharply in while the nose is dropping will speed up the nose-down rotation, making a tumble more likely.*

If the wing attitude is too steep nose-up, the airspeed will drop away, the angle of attack will rise rapidly beyond the stalling angle and then the nose will drop very sharply. In extreme cases the nose-down pitching moment at the stall will accelerate the wing and trike into a rapid nose-down rotation, causing loss of control and inversion of the trike.

As the wing passes the inverted attitude, a strong wing nose-up pitching moment is generated, but the angular momentum of the trike continues the rotation. Then, the front strut or control frame basebar are broken by enormous forces too great for the pilot to counteract. The propeller slices into the rear rigging and wing keel.

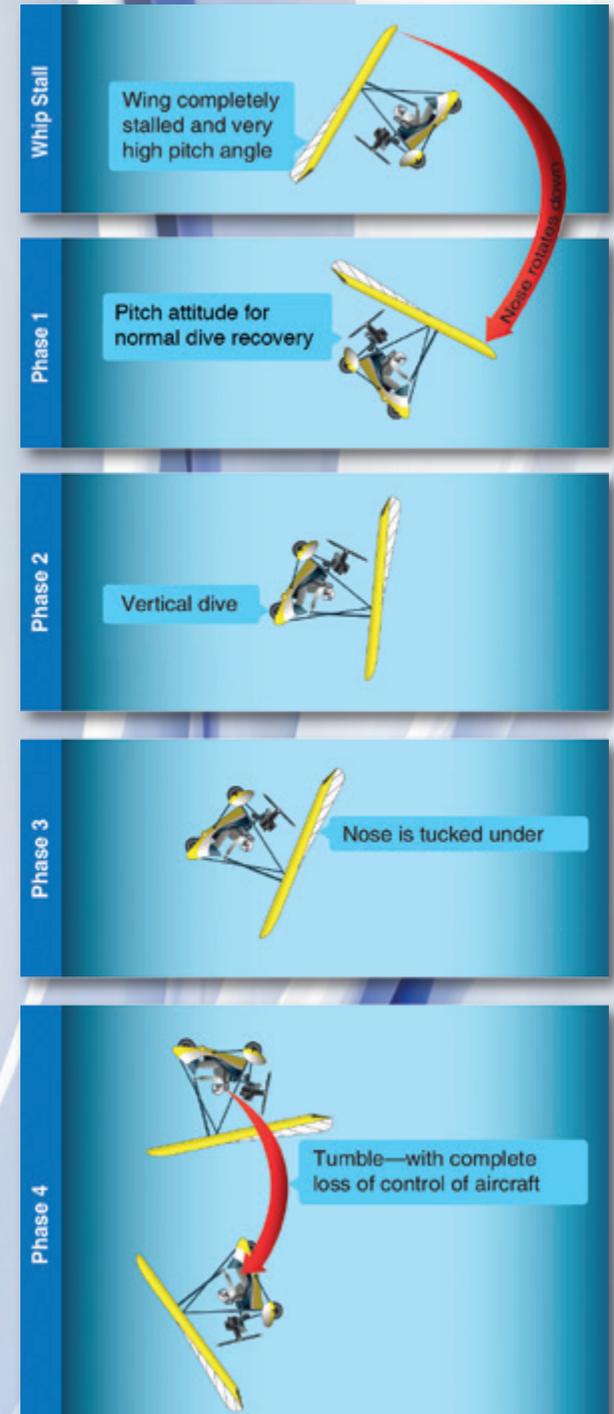
How tumbles happen

Phase 1 – best chance of recovery is to keep the bar pushed out as the nose drops. Applying power will damp the nose-down rotation. Rolling out of the nose-up attitude might enable recovery – but weight-shift is not very responsive in this condition.

Phase 2 – as the loading transitions into negative, the best chance of recovery is to pull the bar in. (A tumble cannot be sustained if the trike mass is at the noseplate.)

Phase 3 – by this stage the rotation speeds up and control is lost as the wing tucks under.

Phase 4 – the high angular momentum of the trike is counteracted by positive pitching moment of the wing, tearing the control bar away from the pilot. Generally the control bar or trike front strut fails at this stage. The trike rotates backwards, falls into the sail and one or both leading edges fail under negative loading. Either an autorotation develops (sycamore seed) or the tumble repeats until complete breakup...



▶▶▶ Tumbling

▶ The end result is generally fatal although in some instances the outcome can be different:

- 1 the control bar fails, the wing folds upwards and the trike/wing starts to autorotate like a sycamore seed, making survival possible;
- 2 the front strut fails, the trike structure partially fails and the wing re-stabilises
- 3 the trike falls into the inverted wing, one leading edge fails and an autorotation develops.

All of these have happened in accidents that have been survived, albeit with serious injuries.

Such accidents are avoidable by proper training in avoiding the steep nose-up “whipstall” condition and knowing how to handle engine failure in steep climbs at low airspeed. Flown inside the placarded attitude, loading and speed limitations, flexwings are very safe aircraft.

The Mainair Flash range has had a history of inverting when flown in steep banks with rapid roll reversals; for this reason, a BCAR-S certification requirement was introduced many years ago to require roll to be damped in such manoeuvres. There was one case where an upset was caused by flying into the aircraft’s own wake in a steep turn. Correct adjustment of the luff lines and washout rods is crucial for safety, on these types in particular. In contrast, the Blade has had an excellent safety record with respect to tumbling.

Later generations of flexwings since the Quik use a short control frame with the propeller running behind the wing keel. This allows a larger angle of attack range and

it is possible to demonstrate a true aerodynamic stall by a slow-rate speed reduction without having to resort to accelerating the entry. The aerofoils, distribution of the profiles over the span, twist, taper ratio and sweepback are optimised to give a very progressive stall with plenty of pre-stall buffet and a docile stall break.

The pitch stability built into the wing and the short control frame have also resulted in higher pilot pitch forces, making it much less likely for the pilot to enter an inadvertent stall. The more compact layout also results in less pitch inertia. Also, these wings are generally trimmed with a forward hang point for cross-country flying at higher speeds, further from the stall condition. It is still possible to enter the steep nose-up/decaying airspeed condition necessary for tumble entry, but it requires a more determined and sustained pilot input.

There are some useful references on tumbling. The illustration shown overleaf is based on an article published by the Recreational Air Association of New Zealand (RAANZ), which you can find at tinyurl.com/triketumble1. There are also some papers written by Gratton and Newman, available on the Brunel University site at tinyurl.com/triketumblepaper.

Finally, there are some YouTube videos, the clearest being this one of a tumbling hang glider following a failed spin entry: tinyurl.com/triketumble2.

There’s also this one of a trike tumbling from a failed loop: tinyurl.com/triketumble3.

So don’t even think of trying it! ■



Richard Hudon sent us these lovely photos of Patrick Lemay flying cross-country in Canada

Flying in Canada



To fuel, or not to fuel?

A full tank gives you options, decides Ian Norris

In May I ventured up to Yarrowonga for some long-awaited flying. It had been six months since I last climbed into the cockpit of my QuikR, so first things first: give the trike a good wash and perform the usual checks on the trike before even thinking about firing the beast up.

All went well: the battery even had enough life to turn the motor over! So that afternoon I put some fresh fuel in her and Peter McLean and I went for some local area flying, staying up for some 1.5h.

The weather gods were kind to me, so over dinner, Peter and I discussed where our early Sunday flight should be. Peter mentioned that Albury airport tower was closed for the morning, so that became our planned destination.

Up early Sunday, we headed off to the airport for what was planned to be a very pleasant 2h return flight. In my preflight inspection I noted I had around 40 litres of fuel in the tank, more than enough to get me to Albury and back.

However, I can recall both Peter and Ken saying to me during my training "you can never have enough fuel", something that has always been noted when I fly, even for circuits. So, I put another 20 litres into the trike, even though it wasn't necessary for what we had planned.

After completing my preflight and warming up the

trike, I taxied out to runway 01 for take off, Peter not far behind.

As I climbed out above 1000ft, I noticed a thick fog to the north and east. I discussing this with Peter and we soon realised that flying to Albury would be a waste of time, so mid-flight, we rescheduled our route to head south to Wangaratta, then around the Warby Ranges and back to Yarrowonga.

As we got closer to Yarrowonga we noticed the fog had rolled in. We soon realised that it was impossible to land as we couldn't even make out the runways

As we headed down to Wangaratta, the fog had moved down south, so we rescheduled again and just went for a fly around the ranges. Interestingly, the southwest side of the ranges were clear with not a bit of fog to be seen, so we flew around Lake Mokoan before heading back to Yarrowonga, a nice 50min flight for the QuikRs.

However, as we got closer to Yarrowonga, we noticed the fog had rolled in there. We soon realised that it was impossible to land as we couldn't even make out the runways, so after another quick discussion we headed south to Benalla to land and wait until the fog cleared.

There were rainclouds to the south west over Shepparton, clouds had been sitting there and moving slowly east towards Wangaratta since we took off, but as they were still west of our journey to Benalla they were not a currently a problem. Nevertheless we decided not to mess around and headed down at a fairly quick 80kt, not a problem for these trikes.



When we got down Peter caught up with some acquaintances while I spoke to Anne on the mobile every so often to get an update on the weather at Yarrowonga. After about 20 minutes we got the green light to head back, as the fog was clearing and visibility was about 5km.

Off we went again. We noticed the rain cloud had moved further east, but we still had plenty of time and space to fly on the east side of the clouds.

Again, we didn't waste any time: the journey north to Yarrowonga was at 90kt, with short spurts of 100kt, just because we could. On approach to Yarrowonga, we noted that the fog had not improved from our last report, however it was still OK to land. Peter went in first on a 3 mile final, with me following soon after.

By now you may be asking what the title of this article has to do with the story. Well, it's

about taking risks out of your flight. I could have quite easily not bothered to fill up before we left, as I had plenty for the planned trip.

But unexpected events happen. An easy 2h flight turned into a 3h flight and even if we had been unable to land at Yarrowonga a second time, I still had 2h of fuel on board, easily enough to allow me to make a detour rather than having to force the situation, which wouldn't have been ideal. ■

*Above
In challenging
conditions like this, the last
thing you need is fuel worries*

Sunrise in Canada as Patrick Lemay makes an early start
(photo: Richard Hudon)



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