Avoiding Wirestrikes

With a recent spike in wirestrike occurrences, we are using (with permission) some key tips from Robert Feerst’s “Flying in the Wire and Obstruction Environment” training to highlight the dangers of operating at low level.

Robert Feerst is a leading wirestrike avoidance specialist in the United States, and his organisation, Utilities Aviation Specialists (www.helicoptersafety.com), runs courses all over the world. Robert will be delivering his course at the AIA Conference in July this year.

Human Limitations

Even people that work around wires all the time have struck them – and many knew the wires they struck were there. So why did they hit them? There are many reasons, outlined below, but critically you can only keep about seven items in your head at any one time. The location of particular wires will fall off your list at some point if you do not keep it at the forefront of your mind.

CRM

A critically important tool for avoiding wires is crew resource management (CRM).

When talking about wire-strikes, we define CRM as ‘a formal, mandatory process that requires crew to share timely, flight-critical, information pertaining to all phases of the flight.’
Three key CRM actions that can save your life:

1. Recognising a potential problem or hazard – including when someone is losing their situational awareness.
2. Communicating the issue – clearly and in a timely manner – while making sure you are understood.
3. Reacting in the appropriate manner to remove yourself from the danger.

Complacency

Don’t fall into this trap:

*This is the third time you have been down this line in a week. It’s just a long line of power lines, and the linesman on board is looking for faults. You are somewhat bored, so you set up a competition between you and the linesman, to see who can spot the fault first. Now you are good at this game, you suspect that your eyesight is a little better than his, so you are very focussed on this being an easy winner.*

*Suddenly out of the corner of your eye you see something – instinctively you haul back on the cyclic. As the helicopter staggers upwards, you feel it shudder as the skids just scrape over the wires you hadn’t seen. You realise that millimetres saved your life.*

*As your heart rate returns to normal, you realise your almost fatal mistake. You were not concentrating on your own job – you were doing the linesman’s job.*

Don’t get distracted – focus on what you are doing – even though it might be boring right now.

Interruptions are just as dangerous as boredom. How often have you had a phone ring while you were in the middle of a pre-flight inspection? It takes a while to get back to where you were before the interruption, doesn’t it? Are you always sure you went exactly back to where you left that check?

The only safe way to ensure interruptions don’t lead to omissions is to start back at the beginning. Every time.

A good illustration of the need to keep looking for structures. Even though the single wire is easily seen, it is harder to see the wire between the poles to the right.

Even when you are not flying, look at the hardware, and practise reading it. Take the time to learn how the distribution system works and how it looks.

Looking for wires might be the only option because of hidden structures.

Reading hardware and the environment may help – but don’t count on it. Use all of the other tools you have to forecast where the wires may be.

Stays

Be wary of stay wires, particularly down-stays secured to the ground, overhead-stays that run between two poles, and ascending-stays that are secured to valley walls or terrain higher than the poles.

Floating Earth Wires

Earth wires run between the tops of major structures. Their purpose is to attract lightning strikes, and keep them away from the main wires. These wires are thinner and much harder to see. They will sag like the power wires do, but to a lesser extent.

Whenever you are operating below earth wire level – slow down.

To avoid earth wires, cross over lines at the structures, not between them.

Constant Vigilance

Your most important task is to keep track of all the wires in your area of operation. This is not only your primary task, but also the primary task of all crew in the aircraft. If you keep the wires in sight, then they will stay in your consciousness, and not drop off your list.
Background Changes

Any changes in the background can drastically affect your ability to see wires. The colour and complexity of the background has a significant effect. A complex background, colours that are similar to the wires, and even the colour of the wires themselves, may reduce your ability to distinguish wires from the background.

Whenever you move the aircraft relative to a line of wires or a line of wires changes direction relative to you, your ability to see those wires changes dramatically.

When you move in relation to wires, it changes the relative position of the sun, the colour contrast with the background, your distance from the wires, and the brightness of the wire and its background. Any changes in these elements affect your ability to see wires, and to keep them in sight.

As wires turn corners, go uphill or downhill, they are effectively changing in relation to the background, and will therefore change your ability to see them.

Light

Even a small change in light intensity affects your ability to see wires.

Atmospheric changes, such as changes in sun angle, pollution, mist, precipitation, glare, haze, and even bugs on the windscreen, can make wires disappear in front of your eyes. Bugs will encourage your eyes to focus on the windscreen, and not at a distance – remember the guideline above for dealing with illusions – constantly focus and refocus your eyes.

Reconnaissance

Complete a full 360 degree reconnaissance of the area you are about to operate in, plus get as much information as possible from your ground-based personnel or clients.

Once you have landed, make sure you do a reconnaissance from the ground, just in case you missed seeing any on the way in.

Don’t be tempted to fly low-level outside the area you have already checked, to get back quicker, or ‘take a quick look at something’.

If you do choose to do this, you need to climb to a safe height and conduct a reconnaissance of the new area.

Structures

Many tall structures have guy wires that can extend great distances away from the structure and are particularly difficult to see. Keep well clear of the airspace around any tall tower.

Power

Be suspicious of any structure that uses power. Power is often supplied via an underground cable – but not always. Be especially careful of single wires strung around farm buildings. They are particularly hard to see, and can also be attached to hidden structures.

Be positive in how you ask people, such as farmers or landowners, about wires or hazards. Use phrases like, “Where are the wires around here?” and, “How do these structures get their power?”

Illusions

There are four ways to tackle illusions:

- know that illusions exist
- keep the structures and hardware in sight
- slow down, and
- constantly focus and refocus your eyes.

The three places to be particularly aware of wires are:

- below 500 feet agl over flat terrain
- over water – especially crossing rivers
- anytime you are operating below the ridge-tops.

Whenever anyone on board sees wires, in or near the flight path, they must identify them to everyone else on board.

This is a critical element of the CRM tools discussed above, and every crew member must be on the lookout for wires. Even if you see them yourself, say so, so that everyone can see and identify them – they might see ones you have missed.

Seeing one set of wires is not a cue to stop looking – keep up the search.

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Blue sky does not necessarily give you an advantage when it comes to seeing wires. Just because it is a clear day does not mean it improves your chances of seeing wires. It still depends on all the factors discussed above.

Distance Judgement
Judging your distance from wires by reference to the wires will not work. If you try this, you will be subject to a number of illusions, and they fool even the most experienced crews.

Latticework Structures
From the right angle – or wrong angle as the case may be – latticework structures disappear against busy backgrounds. Even though they can be large structures, they can still do a disappearing act – keep them on your list, along with the wires.

Operators
The best way to protect yourself, and your organisation, from wirestrikes is to set and follow appropriate operating procedures that specify the standards your organisation will operate to, and how all your employees will behave. There is great benefit in establishing an in-house wire strike prevention and refresher programme.

Developing and maintaining good working relationships with your clients is critical to ensure you get as accurate information as possible about the location of wires in your operating area.

Attending courses like Robert Feeric’s is also important for all of your employees, even those that work on the ground.

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