



Over-the-Counter Incompetence

Fatigue is a complex syndrome with many causes – Mark R. Rosekind, Ph.D., NTSB

Scott banked into his rising wing, felt the glider rise and raised the nose because the thermal gust had kicked up his indicated airspeed 20 knots. He tightened the turn to stay in the lift, lost it anyway. He felt frustrated and tired. A small, turbulent thermal – it would kick him up for most of a turn, then let him down. The number on his averager was not what he expected today.

Then he looked at the display on XC-Soar. His circles were all over the place – intersecting, overlapping, but not concentric. The broad green flightpath lines showing good rates of climb were clustered together, making criss-crossing arcs through an area of green – it was he who'd been wandering, not the thermal.

It had been a stressful week at work; the

pressure of a white paper to finish, a new manager marking the corners of his territory in tedious committee meetings. Last night, the forecast promising a great soaring day, he'd taken an over-the-counter sleep aid – something mild – to make sure he'd be rested for today's 300k triangle.

But at the rate he was going, he'd be lucky to make 150k. Somehow, he had to figure out why he was having trouble coring this thermal. He'd slept well last night; he didn't really feel sleepy – maybe he needed to fly more.

We are unaware

Perhaps you've noticed there's an underlying principle that motivates these essays of mine: it's the things we can't perceive that cause accidents (the bad things we *weren't* planning).

Today's points are that over-the-counter (OTC) antihistamines imperceptibly

degrade skill, and that we remain unaware of this degradation for long after it's begun. This is shown by the figure, *Alertness Reports often Inaccurate*, from the NTSB. The top line is how vehicle operators *feel*; the bottom line is how they are simultaneously *performing*.

Effects of Fatigue

The risks to transportation safety, says the NTSB, are (in this order!), fatigue, medication, alcohol, and distractions. *Clues* to fatigue, in order, include performance errors (85%), recent work/rest history (65%), circadian factors/jet lag (61%), time on task/time awake (50%), medical issues; both disease and meds (31%), feeling tired (19%), etc.

I show this list to demonstrate to you that *making a mistake* is a much better sign of fatigue and impairment than feeling tired. In fact, feeling tired is a danger signal that warrants an immediate response.

Fatigue, no matter what the cause, degrades by 20-50% reaction time, judgment, memory, attention, communication, mood, and situational awareness. It increases irritability, attentional lapses, apathy, and microsleeps. Fatigue degrades every aspect of human skill or judgment. And fatigue is caused by *many* things, not merely lack of sleep.

In this essay, I want to focus on the effect of OTC medications to produce fatigue.

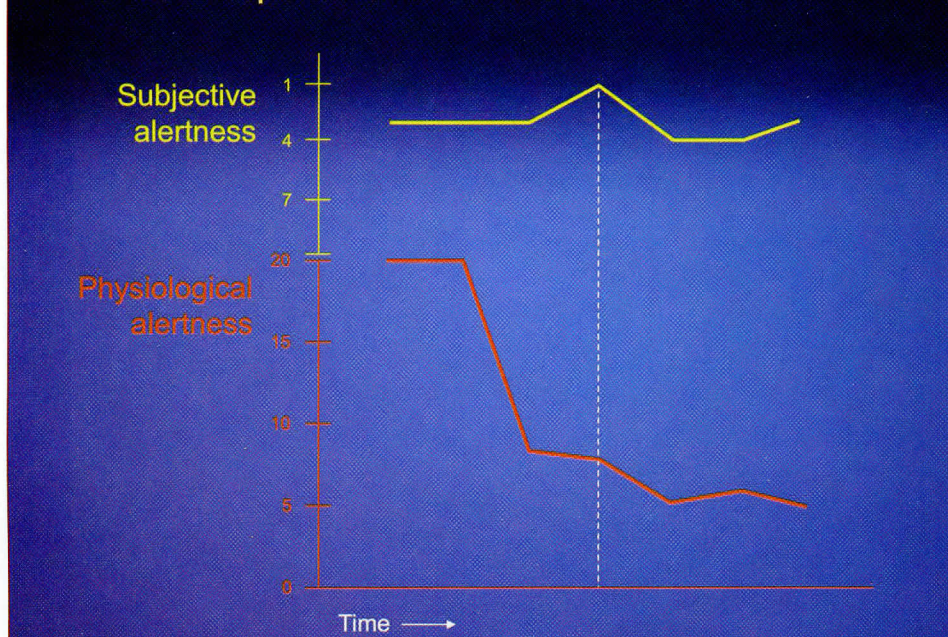
Pilots do use drugs

Each decade, the NTSB publishes a summary of the pharmacological analyses of pilots killed in crashes. Each decade there are more drugs found, possibly because the instrumentation is so much better. The most frequent are OTC meds, many of which impair response time, perception, reasoning, memory or coordination.

It's always amazing that a few accident pilots have been using a combination of impairing drugs, usually both prescribed and OTC at the same time, often mingled with a little alcohol. These combinations more than add up.

I mention this partly because some glider pilots are medical escapees from the FAA medical certification process, and are sometimes taking impairing drugs such as seizure meds (typically for pain), antidepressants, tranquilizers, sleeping pills, or allergy meds. These

Alertness Reports Often Inaccurate



pilots typically *feel just fine, thank you*, and we have no benchmark to measure impairment in a pre-flight check.

Deadly diphenhydramine

Alliteration is fun, eh? The truth is that during the last decade, medications that impair thinking were present in 12% of pilots involved in fatal accidents. Slightly more than half of these pilots had taken diphenhydramine, most commonly known as Benadryl, also in Nytol, Sominex, Tylenol PM, and many, many other over-the-counter medications.

Let me say this: **there is no reason for any sane person to take diphenhydramine.** It's an old drug with too many side effects. It is mostly used for allergy and sleep, as it's an antihistamine that is sedating. It causes dry mouth, increased heart rate, agitation (in some), and slowed urination in old men. Why do this to yourself?

Sedating antihistamines – diphenhydramine in particular – are the medication found most frequently in pilots who have had fatal crashes. After taking sedating antihistamines people don't feel sleepy, yet they have difficulty staying awake and performance is impaired.

For example, a study compared diphenhydramine (50 mg), alcohol (enough to get BAC to 0.10%, the legal limit in most U.S. states), and the non-sedating antihistamine fexofenadine (Allegra^M) (60 mg) on driver performance. These are usual doses of each medication.

There were two important findings: First, **diphenhydramine was more impairing than alcohol.** Drivers had slowed reaction times, delayed perception, imprecise maneuvering, and "steering instability." Fexofenadine and placebo were equivalent.

Second, **drivers' own sense of fatigue was not related to their degree of impairment.**

There are better sleep aids and better allergy meds.

Better sleep aids

Melatonin

The FAA does not disapprove of melatonin, but 3 mg or more has been shown to impair alertness into the next day. I recommend you not take so much. The physiologic dose of melatonin is 0.5 to 1

mg once daily. This is not a sleeping aid: it helps manage your circadian rhythm, to improve sleep quality. See Soaring Rx, August, 2012, for more details, or <http://www.danlj.org/~danlj/Soaring/SoaringRx/2012-08-JetLag-P14-17.pdf>

Sleeping pills

The FAA allows only four sleeping pills, used a maximum of twice each week, with a required "down time" after each dose based on their known pharmacokinetics:

Sedative-hypnotic Medication

Down time after use

Approx cost/dose

eszopiclone (LunestaTM)

30 hours

\$7.70

zolpidem (AmbienTM)

24 hours

\$.60 / \$7

zaleplon (SonataTM)

6 hours

\$5.00

ramelteon (RozeremTM)

24 hours

\$5.70

Frankly, you should use these guidelines for driving (and doing intellectual work!), not just piloting, for most sleep aids have been shown to decrease performance for many hours after use. It doesn't take much intelligence to live a normal adult life, so most people don't notice.

An uncommon but scary event after taking a sleeping medication is *sleep driving*, driving after using one, with no memory of the trip. It's not so good if you have a new dent in your fender the next evening and don't know how it got there. We like glider pilots to know where they started the flight.

Better allergy aids

The FAA approves these allergy meds: The antihistamines fexofenadine (AllegraTM) and cetirizine (ClaritinTM) for general allergy, and cromolyn (Nasal-cromTM) nasal spray or any nasal steroid spray, for nasal allergy. Cromolyn is very nice because it is effective, it has no side effects and is OTC. The nasal steroids are more effective but require a doctor's prescription and are much more costly.

Cetirizine (ZyrtecTM) is less sedating, but is not so much as to be approved for pilots. It's derived from hydroxyzine, a

very effective antihistamine first used as a mild tranquilizer and sedative.

Over-the-Counter junk meds

There are three reasons for a medication to be sold without a prescription:

1: It was already on the market in the ancient days when the FDA had no authority to regulate it, and it was "grandfathered." Examples: diphenhydramine (Advil PMTM, Tylenol PMTM, many others).

2: It was a prescription drug until something better was developed, so the old stuff was put on the OTC market like tattered used clothes handed down to a poor relative. Examples: chlorpheniramine (CoricidinTM), brompheniramine (DimetaneTM), doxylamine (NyquielTM).

Or its side effects are thought to be safe enough. Examples: meclizine (AntivertTM), a drug that doesn't help dizziness very much; dimenhydrinate (DramamineTM), even less effective – both are sedating antihistamines. An Internet site says about dimenhydrinate, "...if you take 10-15 of them you will probably be really tired and quiet and forget everything you are saying you will see that everything around you starts to morph slightly..."

3: An actual, rational decision was made that the drug is actually safe enough to use for nearly everyone. Examples: the ulcer drugs cimetidine, famotidine, and ranitidine (TagametTM, ZantacTM, and PepcidTM). All are available in tablet sizes 25% of the prescription dose.

Why the FDA requires manufacture of an ineffective dose of a safe medication is related to the belief that people widely double and redouble the doses of OTC meds – scary when you think of the long duration of diphenhydramine in the body or the toxicity of acetaminophen (TylenolTM) for the liver. And a realistic concern, given the quote two paragraphs back.

And, of course, some drugs are legal and unrestricted because of political or cultural pressures. Alcohol, for example.

Many people use **alcohol** as a sleep aid, though unwisely because they don't understand its pharmacology. "Eight hours from bottle to throttle" is a useful rule for a *single* drink. Alcohol produces sedation and drowsiness for about four hours; after this, the alcohol has been converted to aldehydes, which produce stimulation,



hypertension, and wakefulness that last about eight hours more. The actual duration of drowsiness and later stimulation depend on the amount of alcohol drunk, your body size, and your sex.

The ideal time to take alcohol for this medicinal effect is when you wake up during the night and can't sleep. A glass of wine or beer will help you sleep for 4 hours or more, then help keep you awake through the next morning. But I know of no one who drinks this way!

My bottom-line thoughts

My *job* is prescribing drugs. Let me say that they *are* useful, but they are not magic pixie dust, and they *always* have adverse effects, which usually aren't show-stoppers, but need to be understood. Get an explanation of the fine print, not only the advertising copy!

It's not a good idea to use anything before flight that is disapproved by the Air Force or the FAA. There are always reasons for this disapproval.

Second, if you feel *fatigued* – worn out, sleepy, demoralized, weak, and so on – please understand that you became impaired *quite awhile ago* and act accordingly. There are many causes of fatigue, some of which may be cured by a good thermal on a brilliant day, so it's always a good idea to examine ourselves about the likely cause. The question is: can I competently do what I'm expecting of myself? The answer varies.

The Federal Air Surgeon, Dr. Fred Tilton, says that if for some reason we need to fly after needing to take a sedating medication, we should wait five half-lives after the dose. As this number may be hard to find, use 5 times the maximum inter-dose interval on the label.

Read the fine print

Sedating antihistamines available in OTC medications include brompheniramine, chlorpheniramine, diphenhydramine, doxylamine, pheniramine, phenyltoloxamine, promethazine, triprolidine, meclizine, and dimenhydrinate. *There is no reason, ever, to take any of these drugs.*

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