Being the fearless leader of this group comes with a few privileges; one of which is writing an article every 2 months. For your pleasure and enjoyment, I have chosen the topic - Situational Awareness. To keep things simple, I will refer to it as “SA”.

All kinds of intriguing thoughts occur as we assess the “SA” of others as well as ourselves. The very nature of what we do calls for a highly developed “SA”, not only in how we maneuver our aircraft, but the inter-relationships between the task at hand, weather conditions, the type of product being used and our targeted pest. In addition to our skill level, other influencing factors include information gathered from the customer and office personnel, proper documentation, product on hand, proper mixing and loading practices and locating the correct field.

Being able to hold an accurate “SA” rests in your ability to ask the right questions about the task at hand. The more detailed your questions, the better your understanding and awareness. The questions must be of a technical nature which deal specifically with the surrounding circumstances associated with the job.

You must also be aware of factors affecting your personal ability to make a proper SA assessment. For instance, we, as human beings, all carry varying amounts of emotional baggage that may affect our focus on the job at hand.

How is your technical and personal “SA”? How about your “SA” with the rest of the world? How’s your environmental “SA”? Are there some areas of improvement in one or all of these areas?? Our challenge professionally is when a problem arises, you will be judged by the “SA” of the general public and, eventually the various agencies that regulate and oversee our businesses.

As we head into autumn 2003, the CAAA board will be assessing the “SA” of our organization and how we relate and communicate with our members, the various government regulatory bodies, and with the general public.

If “SA” has not become a priority to you, I would like you to consider what happened in the beef industry with BSE (mad cow disease). The individuals now responsible to manage and correct the situation are reacting, versus the preferred proactive approach. The repercussions of the reactive approach may be devastating for a lot of innocent people. The same situation could occur in our industry. We will not be judged by our best and strongest—but by our weakest link. Our “SA”, as an industry, needs to improve. We need to illustrate we are responsible and educated professionals, on a continuous journey of learning and improvement.

Ensure you block time for our convention this winter. There will be educational tools available for self-improvement and to improve your business. Our industry is changing and we can adapt and prosper provided we keep our “SA” well-tuned and prepare ourselves for the task at hand.

If you have a concern, please contact me or another board member, so we can deal with it in Ottawa. Other than that, enjoy the change of seasons. It will help you mark the passing of time.
ALBERTA  
Peter Hansen

The summer has been busy in the South and by most accounts across the province. The grasshopper outbreak in Alberta is predicted to be the worst in 40 years, with some areas of the province setting an all-time record.

Next month, the AAAA Board of Directors will have their first board meeting since the spring. The meeting is designed to address issues arising during the summer and to begin to plan new winter projects. One issue to be addressed is the necessity for aerial applicators to communicate with landowners when oil & gas workers are present on rigs in the field. The AAAA has been working with Transport Canada and Canadian Natural Resources to develop a better system of communication between all parties.

The AAAA AGM is scheduled for the Red Deer Lodge November 17 & 18, 2003. The committee has created a great program with several license credit opportunities. I personally invite all out of province Alberta license holders to this meeting, as it is a great way to obtain credits.

The AAAA is hosting the CAAA 2004 Annual Conference & Tradeshow at the Westin Hotel in Calgary, February 19-21, 2004. The program is complete and the range of speakers and entertainment is excellent. Watch the October New Horizons newsletter for complete program and registration information. We look forward to seeing you all in Calgary.

Have a safe and prosperous remainder of the 2003 season.

SASKATCHEWAN  
Ted Anderson

Greetings from Saskatchewan!

We continue to strive to improve our Calibration Clinics. Some of the Calibration Clinics were delayed until June this year. This presents a problem for our CAP Clinic Analysts, as they are getting into their spraying seasons by this time. In order to be efficient, and allow time for everyone to have their aircraft calibrated, we will need to look at alternatives; perhaps holding some fall clinics may be better. Let me know if you have any suggestions.

As expected, grasshoppers are proving to be a problem in many areas this year. Many of us will be relying on grasshoppers, and other insecticide spraying, since the fungicide season has been limited due to hot, dry, weather. Chickpea acres are almost nonexistent following heavy disease pressure last year, and lower prices.

Anyone applying for low flying exemptions have found out it can be a lengthy process. You must demonstrate you can safely carry out the proposed spraying without creating danger to persons or property. So plan well in advance if you want to apply for a waiver and be prepared for delays.

REGrets from Saskatchewan!

Manitoba  
Matt Bestland

The vast majority of Manitoba is enjoying very good growing conditions and excellent crops. Conditions in the southeastern part of the province have been challenged by excessive moisture, while the Interlake portions are considered on the dry side. The western and parkland regions of the province have good to very good crops. A timely rain at the time of this writing would finish off things quite nicely. Insect pressure throughout the province has been light with the odd area reporting medium pressure. The SEAT program has been quiet lately with the forests greening up.

Regarding the new Legislation limiting landings and takeoffs from Provincial roadways, the revised draft has been sent to the Legislature for discussion and finally to put into law. There have been two requests to date, one being granted and one referred to the local RM. The province has accommodated these requests within 48 hours which was one of the main concerns when it was presented to the MAAA last year. The pre/post harvest opportunities look promising and by the time you read this we will know if they have panned out or not.

To change topics for now, future MAAA member Troy Bodie, son of John and Shirley Bodie, was selected in the recent NHL entry draft. The 6’5” 205 lb. Kelowna Rocket forward was selected in the 9th round by the Edmonton Oilers. Way to go Troy and good luck.
WCAAA Message
Jen Kinniburgh

As this edition of the newsletter is issued, many of you will be feeling the stress and fatigue of spray season 2003. Our particular area of Central Alberta is just now gearing down from a grasshopper run that started the first week in June and stayed consistent all the way through July. We are now preparing to combat the Beet Webworm, Diamond Back Moths and Lygus Bugs which have started to show signs of damage to fields.

The 2004 WCAAA Scholarships are once again in place—a very special thank you to the Kemper’s for yet again sponsoring the Queen Bee Scholarship. Also a big thank you to Brian and Tom Kinniburgh for sponsoring the Scott Kinniburgh Memorial Scholarship. The longevity of the scholarship program is dependent on the continued interest of applicants. Please review the criteria for each scholarship, and bring it to the attention of anyone who meets the application requirements.

This year’s raffle ticket item is a Honda Pump donated by Gary Moffat of Specialized Spray Systems. The pump will be awarded to the winner at the 2004 CAAA Convention to be held in Calgary, AB in February. Please take a moment to fill out your tickets and send them back. This year’s lucky winner may just be you!

In closing, I wish you all a productive remainder of the season and remind you: Think Safe; Fly Safe; Be Safe.

NAV Canada Fee Increase

In 2000, the Canadian Aerial Applicators Association successfully lobbied NAV Canada to reduce annual charges for aerial agricultural registered aircraft. Originally the NAV Canada annual fee was $300.00. Due to the CAAA’s efforts, the fee was reduced to $58.00. This was a $242.00 reduction per aircraft per year.

On August 1, 2003 Nav Canada announced a fee increase to ensure continued safe and efficient air navigation services. As of March 2004, the following annual fees for aerial application aircraft will be in effect;

<table>
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<th>ANNUAL CHARGE</th>
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<tr>
<td>Weight (tones)</td>
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<tr>
<td>0.6 - 2.0</td>
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<tr>
<td>2.0 - 3.0</td>
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<tr>
<td>3.0 - 5.0*</td>
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*Flights by aircraft over 3.0 tons restricted to aerial agricultural spraying continue to be subject to the daily or movement-based charges as applicable by aerodromes.

As of August 1, 2003 the following daily movement fees will be in effect:

<table>
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<th>DAILY MOVEMENT CHARGE</th>
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<tr>
<td>Weight (tones)</td>
</tr>
<tr>
<td>3.0 - 5.0</td>
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<tr>
<td>5.0 - 6.2</td>
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<td>6.2 - 8.6</td>
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Scheduled maintenance trips are exempt from movement-based charges; note the maintenance reason in the logbook and return it to NAV CANADA with their invoice for any charges on a maintenance flight.
Important Notice!  
Roundup/Vantage Qualification Lists

The CAAA website contains a list of pilots and companies qualified to apply Roundup and Vantage. If your name is not on the list, please review the requirements below. If you are missing any of the following information, please take the necessary steps to provide the information to the CAAA office immediately. The website list will be updated regularly.

Pilot Checklist:

- I have a current Provincial Pesticide License.
- I have received the product specific training course and exam provided by Monsanto and/or Dow AgroSciences Ltd. (The course and exam are only required to be taken once. This information is supplied to the CAAA by Monsanto and Dow AgroSciences Ltd.)
- I have the required amount of flight time - 250 hours of ag time with 100 in the last 24 months. (Proof of hours must be supplied to the CAAA office by faxing a portion of your flight hours log book to 780-413-0076)

Company:

- My company has a current Service License (Alberta and Saskatchewan only, must be purchased annually from your province)
- A Calibration Clinic has been performed on my aircraft within the last 20 months (All non-CAAA calibration certificates must be faxed to the CAAA office at 780-413-0076)
- I have the required $25,000.00 Drift Insurance coverage for my aircraft (if not a member of the provincial drift insurance fund, proof of insurance must be supplied to the CAAA office annually)

Do you remember when?

- It took five minutes for the television to warm up?
- Nearly everyone’s Mom was at home when the kids got home from school?
- A quarter was a decent allowance?
- You’d reach into a muddy gutter for a penny?
- Laundry detergent had free glasses, dishes or towels hidden inside the box?
- It was considered a great privilege to be taken out to dinner at a real restaurant with your parents?
CELA’s Library website: Cereal Pre-Harvest Thistle Control

There are two battlefields with Canada thistle. One is a battle against plants established the previous season or earlier. These plants send up shoots and rosettes when the soil is warm. The second battle is against shoots resulting from seed. They germinate about a month later than the crop, and you can’t see them in the crop unless you purposely look for new patches.

Canada thistle is a ‘late riser’. Seeding is usually finished, and the crop is either up or emerging when the rosettes appear. During spring, thistle plants are supported by established root systems, and emergence is uneven. The internal flow is upward to feed new leaf tissue and flower buds. The thistle rosette at pre-seed burndown application may be the toughest time to completely kill Canada thistle. You can set the thistle plants back at this stage, but virtually no herbicide will get down to the roots.

As cereals ripen, Canada thistle finishes flowering and seed production. At this point, Canada thistle turns its full production downward to feed the roots, expand the root network, and store reserves in the root system. The roots become stronger and more vigorous than they were a few weeks earlier, but are still vulnerable.

In this window, a pre-harvest glyphosate application, like Vantage Plus, dries down the cereal crop and readily translocates to provide a high level of weed control. The benefits of a pre-harvest application of Vantage Plus is that it is a powerful, non-selective herbicide that has the power to control weeds below the crop canopy, as well as rainfastness in one hour. A pre-harvest glyphosate application provides better weed control the following spring and improves perennial weed control while providing burn down control of winter annuals.

In addition to Canada thistle, a pre-harvest application of Vantage Plus will control perennial sow thistle, dandelion, quackgrass, milkweed and toadflax.

The harvest results of a pre-harvest glyphosate application include more even drydown, with reduced losses and a cleaner, higher grading crop. The advantages of aerial application include reduced crop trampling and the ability to cover more acres faster in the tight pre-harvest window.

Pre-harvest glyphosate application is not recommended in extremely dry conditions, or in the case of extremely cool, or cloudy conditions. Application in an immature crop may also reduce yield, grain quality and leave excess residue in the crop.

Aerial applicators must complete Dow AgroSciences Vantage Plus training prior to providing growers this service. For more information on Vantage Plus product use or Vantage Plus Aerial Applicator Training please call the Solutions Center at 1-800-667-3852.

Wire Watch Program

In 2002, the Canadian Aerial Applicators Association (CAAA) & CAIR developed a voluntary wire strike reduction program called the “Wire Watch Program”. The goal of the program is to reduce wire strikes involving CAAA members. Information obtained by the program will be used to develop a CAIR safety seminar on wire strikes. The provincial hydro companies have been approached to participate in the program with educational and sponsorship opportunities. This participation could create a stronger partnership with the hydro companies and increased communication regarding wire strikes and prevention programs.

Both the CAAA and CAIR feel, if members share their experiences regarding wire strikes with others, it will reduce wire strike incidents and decrease insurance claims to CAIR. Transport Canada has informed the CAAA they have established a goal to reduce aerial applicator accidents by 25% during the next few years. CAAA and CAIR are confident safety programs, such as the Wire Watch Program, will assist meeting this goal. CAAA members are asked to complete the Wire Watch Program form on the website at www.canadianaerialapplicators.com and fax it to the CAAA office. This information is important to your industry—so please remember to participate in the Wire Watch Program.
In today’s world, farmers are facing ever-increasing pressure from external sources. Farmers face a number of challenges in dealing with this pressure and trying to operate a successful farm at the same time. Global warming is contributing to dry and hot seasons that makes growing any sort of vegetation a challenge. Flooded markets are dragging down the price of commodities. Even though the prices of commodities are dropping, the input costs for farmers are increasing. Farmers are continually ostracized for the use of fertilizers and pesticides and they are blamed for many environmental problems. In order to deal with the pressure and overcome the challenges, farmers must be knowledgeable in a number of areas.

In the past few years, drought has been a major problem for the farming community in many areas of both Western Canada and the United States. In previous growing seasons, numerous areas have been declared “disaster areas” due to the extreme drought. Farmers must be well educated in practices that conserve moisture in order to offset the dry conditions as much as possible. For example, practicing zero or minimal tillage reduces the disturbance to the soil and minimizes evaporation of precious moisture. This technique also decreases wind erosion as the stubble is left intact. Chernfallowing land rather than summerfallowing it offers similar benefits. Certain crops can also offer resistance to drought. Some plants such as corn possess mechanisms that conserve water. These properties make certain plants such as corn more tolerable to the hot arid climate that farmers have had to deal with. With the consistent hot and dry conditions that have been present in the past few years, farmers must be knowledgeable of growing techniques that help to offset drought.

Farmers must also be aware of the business aspect involved in operating a farm. Farming is one of the industries where the price of the products is chosen for them. Farmers have no power to determine what their commodities are worth. The price of the products is determined by demand and supply. When the supply is high, and the demand for a certain product does not change, the price will drop. This is the scenario for many of the staple crops such as wheat, barley and canola. Flooded markets have driven the price of such crops lower and lower. Not very long ago, it was easy to get ten dollars per bushel for canola whereas recently the price was around six dollars per bushel. This is only one example. Almost everything farmers produce has followed a similar trend. Just this past summer, cattle were an excellent example. Due to the extreme drought, many farmers had to sell their herds, as pastureland was very limited. The massive number of cattle being sold flooded the beef market and the price of cattle was drastically reduced.

Farmers must be knowledgeable of methods to offset the consequences of the flooded markets and low commodity value. Although there are many restraints, farmers must try to sell their commodities when the prices are high. This is not always feasible as farmers can only store their commodities for a certain length of time before they run out of space. It may be beneficial to seek out new markets where there is greater demand. It is crucial for farmers to diversify their operations to produce goods to be sold in a more specialized market. For example, farmers could raise livestock such as llamas, or alpacas rather than more traditional livestock. Another solution would be to expand the farm to include more than one type of farming. Rather than just raising livestock or growing crops, farmers could combine the two by combining more than one type of farming, farmers have a broader range of products to sell. This provides a kind of backup system where the farm does not have to rely on only one commodity to sell. Having some astute business knowledge helps farmers to respond to changing markets and to make their farm a profitable operation.

Although the prices of many commodities are continually fluctuating, the cost of inputs has either remained the same or increased. Farmers must ensure they are making the most of the money they spend to produce such commodities. Grain farmers spend a large amount of money on inputs such as fuel, fertilizer and crop care products. The money spent must not go to waste. Farmers must ensure that the expense of farming is carefully managed. Techniques such as minimal tillage reduce the number of passes made over a field, therefore reducing the fuel burned and wear on the machinery. Soil sampling can determine what nutrients the soil is lacking and farmers can fertilize the soil accordingly thereby getting maximum benefit from the money spent on fertilizer. Grain farmers must also possess specific knowledge of crop care products. Using pesticides efficiently and effectively maximizes the benefit to the crop and reduces any negative impact they might have on the crop and the environment.

Farmers raising livestock must also capture the benefits from the money they spend on inputs. Fertilizer blends for pasture can be custom mixed to suit the specific nutrient needs of the pasture. Feed can be used most effectively if a nutrient analysis is done on it. A custom feed blend can be produced from the nutrient analysis. This ensures the livestock are getting the correct amount of necessary nutrients to attain efficient growth. At the same time, feed wastage is greatly reduced. Farmers should be aware of the underlying science and technology that is involved in growing crops or raising livestock.

Despite the great pressure farmers face today, they must continue to produce high quality food no matter what happens as the entire world depends on them for nutritious food. In order to supply the world with quality food, farmers must have and make use of the proper knowledge. Farmers must keep pace with advancing technology. They must practice certain techniques in order to fight the drought conditions that have threatened the survival of many farmers. Farmers must make the most of their inputs in order to increase their profit margin. Farmers can expand their knowledge by seeking the advice of agriculture specialists. The information they provide can help farmers to reduce their expense and help with proper environmental practices. Practicing sound business management can also help a farmer to run a profitable operation. Knowing market trends on a global scale can help farmers to earn more money. In order to survive in today’s world, farmers must have a vast expanse of knowledge to assist them in their operation.
I was raised in the countryside on a 40-acre river lot where my family business was built. Since I can remember my Dad started his day every summer before the sun came up to go help the farmers grow their crops. Farming, in all aspects surrounded our acreage.

I would be around my dad and our customers as much as I could. I would hear a lot of conversation like:

“If it would only rain...”
“If it would only dry up...”
“If we have a late spring...”
“If we have an early fall...”

I thought if they got up as early as my dad and got their work done this shouldn’t matter. But I have always been interested in learning all there is to know about farming and today I assist my data with a small acreage. Our small acreage is 700 acres, which my Grandpa said would feed two families in his day and then some. They had a few chicken and a pig and lived quite comfortably on fewer acres. There was a lot of tilling and no inputs like today. Our small acreage pays the expenses leaving enough to start farming next year.

To intelligently speculate on the future of farming we should take a look at how far farming as come in the last fifty years. The machinery has gone from horse drawn plows, cultivators, etc. to horsepower engines. I have grown to like farming and my family says you can’t possibly make a living unless you farm big with a lot of diversified crops and therefore a lot of different machinery.

That is what is happening today so I can only make an educated guess based on the little I know about farming along with answers I received when I asked others about their ideas on the future of farming.

I believe farmers in the future will all have large acreages with diversified crops, managers and on-staff agronomist. To keep input costs down they will purchase from a co-op or join a buying group. I believe that more spraying will be custom done to meet optimum timing and cutting costs on new, used or leasing equipment.

Canadian farmers need to lobby the government for subsidies relative to the U.S. The prices they are getting are very low and without the proper subsidies the average farmer cannot exist.

I decided to get some opinions from other people to get a more rounded view on the future of farming.

The first person I asked was my Dad. I thought his opinion would be interesting seeing he farms plus what we joke about, “Farms the Farmer”. Dad’s view on the future was that farms were going to continue getting larger and there would be a greater demand on custom help. Dealer network services will be in greater demand. Prices for commodities will continue to fluctuate up and down as world demand set precedents. The custom application business will have to keep in tune with the changing machinery and be up to date with change as well. If not they would lose business to a business that is up to date with machinery and technology. Dad also brought to my attention the pressures of environmental issues were going to magnify and how it would affect the farming industry would depend on how the government views it.

I then decided to interview our two full time agronomists to get their opinions on the future of farming. A healthy future would also benefit their career and they felt technology would have a huge impact in the future. They brought to my attention that with the population of the cities getting larger we would be looking at a shrinking land base in the future. Therefore with biotechnology happening with seed like canola; wheat corn; etc. a seed producing more per bushel would be necessary. A genetically modified seed, which required less input used for weed and pest control would be environmentally friendly. At present the genetically modified seed is causing a huge public concern and more education of the public is necessary to make it fly without health concerns. Specialty canola is being developed to product more oil per plant so with the shrinking land base more can be produced. They also mentioned that farms would get bigger and smaller farmers would be selling their land to those who decided to stay in the business.

In 1992 the average farmers’ age has gone up so the days of taking over the family farm is over. Farmers are going to have to be more educated on what is new in the industry. They also mentioned that future farmers would have to fight for more subsidies to keep going and be competitive.

The people I interviewed all agreed that precision farming in the future was inevitable. Farmers would have to keep on top of soil testing and field mapping. G.P.S. in all machinery would be introduced. Field mapping and accurate record keeping with proper rotation of crops. Record keeping in the future would be required when grain is sold. Buyers are going to want to know the inputs were used and at what stage for quality assurance.

Labour in our area is a problem on the farm and will be more of a problem in the future. Potato growers in our area need truck drivers and dirt pickers at harvest and they are unable to fill these positions. Wages may be a factor as well it is only a part-time position.

In the future large farms will be hiring full-time managers and on-staff agronomists to keep on top of their entire crop needs.

Another area in the farm industry is the chemical companies which are already seeing a big change. The mergers taking place have reduced the number of companies and in the future it will get worse. Farmers will be using buying groups and tenders for their inputs. Tendering of machinery is also a possibility.

I read in an article that said, in California, farmers were receiving prescriptions based on government regulations on what crops need. From the fertilizer through to the herbicide and if pests are a problem what should also be used to control them.

That is the “Future of Farming”.

In closing I believe farming is a good honest living and farmers have a sense of pride in producing such a well-needed resource. The public should be educated to respect farmers and realize they are feeding the world.
Fatigue. Everyone knows that it is bad, but excessive fatigue is often seen as a badge of honour—as if to show how hard we’re working, instead of how dangerous we have become. Regulations attempt to govern it through duty times and mandatory rest periods, but the arguments as to their effectiveness continue.

The helicopter industry in Canada see fatigue from many sources. We have ambulance pilots working 12-hour day and night shifts, spending endless hours waiting for the phone to ring. In the summer, VFR pilots routinely fly 10 or more hours on seismic, logging, or forest fires—often for weeks on end. Spray pilots fly only at dawn and dusk (frequently after a long ride to the spray block) with terrible sleep schedules that involve a few hours at night and a few more during the day. Maintenance is routinely performed at night, when the machines are not flying, and late-night or early-morning run-ups are common. Pilots in Arctic camps may sit for days in bad weather, only to see it clear at 2 a.m., and be expected to go flying.

If there is one thing we know about fatigue, it is that it leads to human error, and the consequences are seen everywhere. In June 2001, just north of Albury, Australia, a convoy of six tractor-trailers was involved in an accident that scattered wreckage over several hundred metres and closed the highway for hours. The convoy was “slipstreaming”, a common practice in motor racing and trucking, which involves the lead vehicle effectively towing those behind in its wake. The Transport Workers Union claimed the practice was used to save fuel, and even to keep the vehicles going if the drive fell asleep. It was just one example, they said. Of the measures driven had taken to meet unrealistic deadlines.

There are other high-profile examples of accidents in which fatigue played a starring role:

• The managers who authorized the launch prior to the Challenger explosion in 1986 had had little sleep the night before.

• The pilot-in-command of the Cessna 177B Cardinal in which he, seven-year-old Jessica Duboff and her father were killed, suffered fatigue that seems to have impaired his judgment; he departed into weather that had convinced a Beech 1990 captain to delay his flight.

• The officer in charge of the Exxon Valdez was acutely sleep-deprived when she ran aground off Alaska in 1989.

• The nuclear accidents at Chernobyl and Three Mile Island, and the deadly chemical spill at Bhopal, India, all involved serious errors of judgment by tired operators.

In studies throughout the Western world, statistical data has proven that an incident rate spike occurs predictably during all night activities. This means your chances of having an accident in the wee hours may be greatly increased, due to degraded performance. In aviation occurrences, the initial investigations often reveal a puzzling lack of judgment by otherwise competent aviators.

It seems logical that to combat fatigue, we need sleep—but sleep is something we know little about. Until recently, the theory was that we slept to give the body and mind a good rest; but that has come under question. We now know that the brain is highly active for some of the time we spend snoring, and that we actually use almost as much energy when asleep as we do when awake and resting. There are two different types of sleep, known as REM (rapid eye movement—that is when we dream, and the brain activity is similar to when we’re awake), and non-REM. Various theories claim that REM sleep plays a part in brain development, maintenance, learning and memory. Babies spend much more time in REM sleep than adults—it starts to decline as we reach our mid-forties, and becomes minimal in later years.

We may not know exactly why we need to sleep, but it is clear that we cannot function properly without it. Sleep-deprivation experiments show that people become progressively less effective as they become increasingly tired. Preventing people from sleeping has been widely used as a form of torture that leave the victims increasingly miserable, confused and suggestible, and may even kill then.

Long-term sleep deprivation studies have been performed on our little friends, the laboratory rats, by Professor Allan Rechtschaffen, Ph.D., the director of the Sleep Research Laboratory at the University of Chicago. Dr. Rechtschaffen and his colleagues constantly deprived an otherwise cheery group of rats of all sleep, and demonstrated a 100% mortality rate within two or three weeks. The rats became increasingly debilitated, developed skin lesions, edema stomach ulcers. They lost weight despite eating more than usual, suffered a drop in body temperature of 6 degrees C, and eventually died. In an interesting twist, if the rats were allowed some non-REM sleep but no REM sleep, they lasted twice as long but still died eventually, after a period of sexual hyperactivity. A control group of rats that were permitted limited amounts of both REM and non-REM sleep, survived.

It’s not clear by what mechanism the rats died, but some of their symptoms pointed to a failure of their immune systems. This is supported by research that has shown a link between diminished immune response and lack of sleep, but other studies seem to have shown the opposite. The jury’s still out on that one. Dr. Rechtschaffen has also drawn a link between overeating and sleep deprivation, as a result of these experiments.

We have all felt the onset of serious fatigue. When the body is ready to sleep, not even the threat of grave and immediate danger will stop it—I have personally dozed off while driving a car, flying a helicopter, and riding a motorcycle, as I’m sure most of you have.

When Charles Lindbergh made the first solo non-stop flight across the Atlantic in 1927, he discovered that staying alert for 33 1/2 hours in the air proved agonizingly difficult. He wrote this passage in his journal, after completing only 9 hours of flight:

“My eyes feel dry and hard as stones. The lids pull down with pounds of weight against the muscles. Everything is uniform blackness, except for the exhaust’s flash on passing mist and the glowing dials in my cockpit, so different from all other lights...My world and my life are compressed within these fabric walls...My mind clicks on and off. I try letting one eyelid close at a time while I prop the other with my will. But the effect is too much, sleep is winning, my whole body argues dully that nothing, nothing life can attain is quite so desirable as sleep. My mind is losing resolution and control.”

To combat fatigue, we must take a multifaceted approach that involves the individual and the organization. On a personal level, we can strive to attain sufficient sleep, and be sure that it

**Perchance to Dream...**

**Printed from Transport Canada’s Aviation Safety newsletter Vortex, Issue 2/2003**

(5) Where the flight is conducted under Subpart 2 of the Canadian Aviation Regulations in aerial application operations, the maximum flight duty time may be extended for a split flight duty assignment provided that:

(a) the total flight duty time shall not exceed 14 hours in 24 consecutive hours; (amended 1998/03/23; previous version)

(b) rest periods that allow a total of at least 9 hours opportunity to sleep in 24 con-secutive hours shall be taken in suitable accommodation; (amended 1998/03/23; previous version)

(c) one of these rest periods shall allow at least 5 consecutive hours opportunity to sleep between 20:00 and 06:00 local time; and (amended 1998/03/23; previous version)

(d) the flight crew member shall receive at least 5 periods of 24 consecutive hours free from duty within each 30 consecutive days. (amended 1998/03/23; previous version)
is of good quality. Sleep deprivation can be the result of everyday factors such as work patterns, jetlag, lifestyle, having young children, the use of alcohol, tobacco, drugs, etc. Relief can often come from dark, quiet, and comfortable sleeping quarters, exercise, a healthy diet, and following a disciplined schedule.

From an organizational standpoint, tasks or assignments where the risk of fatigue is high (shift work, late shifts, long period away, high-flying contract, etc.) should be recognized and identified. Certain tasks could be re-scheduled to a different part of the day, when the employee is more alert. Company policies must be pro-active in combating fatigue, and managers should learn to recognize the signs that an employee needs a break. Tired employees, left on jobs because there is no replacement, seems to be common in our industry, but we all know this is an accident waiting to happen.

Some things to be aware of when trying to prevent fatigue:

**Time continuously awake:** It is ironic that the practice of extending a duty day can increase productivity when used sparingly but can result in a decrease in productivity if used excessively.

In one study by Professor Drew Dawson and colleagues at the Centre For Sleep Research in Adelaide, Australia, it was found that performance impairment after 17 hours awake was equivalent to a blood alcohol concentration of 0.05 percent (for which most provinces now suspend a driving license for 24 hours). However, this study does not suggest people are unable to complete any tasks successfully when they have been awake for an extended period. Simply, over-learned tasks are relatively unaffected by fatigue. This is not the case however, with tasks requiring reasoning or judgment. Performance on these tasks will be impaired and additional fatigue-proofing may be necessary if this performance decrement is to be managed safely.

**Time of day:** The consistency and effectiveness with which a task is completed during a day shift is higher than during a night shift. In addition, fatigue recovery during a night off-duty period is considerably more efficient than recovery during a day off-duty period. These differences occur because the body’s internal clock follows a 24-hour cycle and controls many functions including temperature regulation, performance capability and mood. This cycle includes two periods during the day when alertness is at a maximum (roughly 08:00-11:00 and 20:00-23:00) and two periods during the day when sleepiness is the greatest (03:00-06:00 and 15:00-17:00). As is the case with length of time continuously awake, additional defenses may be required if tasks undertaken during circadian low periods (especially between 03:00 and 06:00) are to be completed to the required standard. Similarly, allowances must be made if off-duty time coincides with a period of maximum alertness.

**Fatigue prior to duty:** Individuals need about seven to eight hours of sleep in order to cope with ordinary demands of everyday life. To the extent that his need has not been met (perhaps as a result of early morning starts, out of phase attempts to sleep, poor sleeping conditions, administrative requirements or poor sleep discipline) individuals will be suffering from acute fatigue. Consequently their performance, especially on tasks requiring reasoning and judgment, will deteriorate as their on-duty time increases. While it’s true there are individual variations and some tasks can be successfully completed by individuals who have had less then their required sleep. These are the exception.

**Sleep Debt or Cumulative Fatigue:** Unfortunately, the body cannot store sleep. Although the loss of a small amount of sleep on a single night may not have significant effect on performance, sleep loss is cumulative - and should it continue for several nights, it will build into a sleep debt. For example, the loss of one hour of sleep for a single night will be undetectable, after the loss of a second hour on the second night the individual will feel its effects, after the third night the effects of sleep loss on performance will be noticeable to an external observer. To manage the fact that it is not always possible for individuals to get all the sleep they need every night, they must be offered periodic opportunities to recover this sleep loss. Research has established that two nights of unrestricted sleep are usually sufficient to recover from even a relatively severe sleep debt.

Therefore, to prevent the accumulation of excessive sleep debt, everyone should be provided with the opportunity for recovery sleep.

So far, we’ve discussed fatigue from quasi-voluntary factors, but much sleep deprivation is involuntary. Physiological problems such as chronic stress, illness, or pain can deprive the body of sleep, as can sleep disorders like night terrors, sleepwalking, narcolepsy, or sleep apnoea. If you suspect you may have a physiological problem or sleep disorder, seek qualified help.

Some of these problems can go unrecognized or untreated because the sufferer may not know that they are sleep-deprived. People with sleep apnoea, for instance, literally stop breathing for short periods during sleep, but may never realize they have a disorder. As sufferers sleep, the soft tissue in the throat relaxes and obstructs the upper airways, causing them to snore loudly and eventually to stop breathing, which causes the brain to rouse and demand oxygen. This arousal interrupts the deep-sleep cycle, and may occur more than a hundred times in a night, without the sleeper’s awareness. As a result, the victim can be chronically fatigued, even though he spent a considerable time asleep. It is estimated that this condition afflicts four percent of the population, usually overweight, middle-aged men (so, does that make us pilots a high-risk category?).

Whether its cause is physiological or environmental, excessive fatigue does not belong in the cockpit, or in the maintenance hanger. Be vigilant of yourself and your colleagues for signs of fatigue around your operation. Try to encourage a personal and company culture that recognizes and reacts to fatigue issues. Get to know the relationship between fatigue and drugs like caffeine, alcohol, and prescription and non-prescription medicines. Be aware of the risks associated with shift work and extended hours. Strive to get optimal rest, both physically and mentally, when off duty. Eating well, staying hydrated and maintaining a healthy lifestyle will all help prevent chronic fatigue. And by all means, take a nap if you need one!

**Thanks to Civil Aviation Safety Authority, Australia, Flight Safety Australia, article “Dead Tired”, July-August 2001 www.casa.gov.au.**

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