Next WingNuts Chapter Meeting: ***Sat. Feb 11, 2023 12:00 PM – Hunter International Air-Field***

Next VMC Club Meeting: ***Tues. Feb 28, 2023 6:00 PM - Hunter International Air-Field***

WINGNUTS PLANE TALK

Chapter 1321 / South Middle Tennessee

Our Chapter Home Page: https://chapters.eaa.org/eaa1321

Editor's Note: Reminder, you can now click on the page number in the index for the article you'd like to read and you will automatically go to that page!

To go back to the Index, select the word "page" at end of article

INSIDE THIS ISSUE

PRESIDENT'S CORNER:

Hello to everyone!

I hope you have had a good month and the wintry mix of weather we experienced didn't cause you any problems!

I look forward to seeing as many of you that can attend at our upcoming Chapter Meeting, Saturday the 11th at Noon.

As, a reminder please bring your completed member survey with you to the meeting. I'll compile a summary of the responses and we can discuss them at our March Meeting. Thanks in advance for filling them out!

You might remember, Glen did a hands-on presentation on the proper crimping of electrical wires. He was going to follow that up with how to properly crimp Coax Cable Connectors but, ran out of weekends.

He has generously offered to give his Coax Cable Presentation at our upcoming meeting!!

We were able to get our Chapter Logo remade into a decal. They are $5.00 each for anyone that would like one or two. Jim or I will take your payment.

That's it for this month's Newsletter! See ya at Hunter!!

Craig Bixby
President

Secretary's Minutes from the 1/16/23 Meeting

Chapter 1321 Met at Hunter Field on January 14, 2023, presided over by our new President, Craig Bixby

Guests and Visitors

Michael Bullington became a Chapter Member and as new resident of Hunter Field he will basing his Cessna 150 here.

Cliff Zimmerly a friend of Tom Lewis visited.

Meeting Discussions

Presented New Year Message from EAA President Jack Pelton
2022 Treasurer Report from Jim J Tjossem
Introduced a Members Survey as a means of gathering information to aid in the future direction of the Chapter (Please take the time to provide your answers)
2023 Projects – New Picnic Tables
Our new president provided an introduction of his background and experiences.
Suggested that a "Get To Know a Member" spot be added to a meeting or in the Newsletter
Suggested possible means of saving Hunter Field
Having Chapter Merchandise available for purchase by the members
- Chapter Logo Decals
- Hats with EAA or Chapter Logo

Upcoming Chapter Schedule

Chapter Meeting will be held Saturday Feb 11th at 12 PM
VMC Club will meet Tuesday Feb 28th at 6 PM
Chapter Meeting will be held Saturday Mar th at 12 PM
VMC Club will meet Tuesday Mar 28th at 6 PM

Treasurer's Report for 2022

2022 Income

Our Christmas party raised $340.00

A Big Thank You to Phillip Moore for the many contributions generated from the Check Rides he gas given

2022 Expenses

We bought a new, larger TV	$384.11
May, Food and Flowers	$150.00
Dec. Business cards	$ 30.00
October and Dec. Chili and Christmas Parties	$185.00

2023 Expense

EAA Chapter Dues and insurance	$398.00

Chapter's Check Book Balance as of 1/9/2023

$3793.88

Jim Tjossem
Treasurer

Reminder: It is time to pay your $20 Chapter Dues. Please see Jim Tjossem!

Best-Glide-Speed Revisited

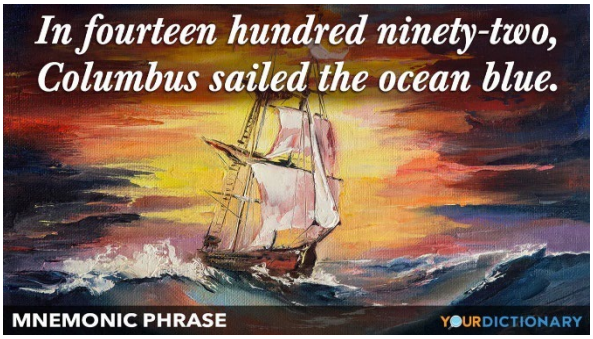
Click the Following Link to Episode 13 of "Fly with AOPA"

https://www.youtube.com/watch?v=eL5ozvDmcbk

Once open select play, Right Click on the videos Time Line, and drag it forward to the 7:35 point in the video learn an easy trick for finding best glide

Training and Safety Tip: Memory Aids

Mnemonic's are musical memory tricks that helps us remember certain facts or large amounts of information



They can come in the form of a song, rhyme, acronym, image, phrase, or sentence. Mnemonics help us remember facts and are particularly useful when the order of things is important.

Acronyms are another equally effective way of embedding data strings in your head for later recall. Acronyms are short words formed by assembling words or word-like strings from the letters of a list.

Typically they are created, using the first letter of each word. For Example

ROY G. BIV

Is the acronym to remember the colors in the color spectrum:

red
orange
yellow
green
blue
indigo
violet

Since we have many lists in aviation, we also have many acronyms!

You've likely learned ARROW is the acronym for the paperwork that needs to be in the airplane for it to be airworthy and AVIATE for the required inspections. Maybe SAFETY for passenger briefings and NW KRAFT for preflight.

But this sheer volume creates a risk: Instead of being used as memory aids, sometimes acronyms are memorized as if they were the end goal.

BUT, it is important to understand that Acronyms aren't lessons. They are only to be used as memory aids to assist in the recall of lessons.

By themselves, acronyms have no use.

You must first understand the material. Before you AVIATE,

AV1ATE (inspections)

Annual inspection (12 calendar months)
VORs (30 calendar days)
100-hour inspection
Altimeter/pitot static (24 calendar months)
Transponder (24 calendar months)
Emergency locator transmitter (12 calendar months; or 50% battery or 1 hour of cumulative use)

You should NOT just remember the types of inspections that are required

But, first you must have a deeper level of knowledge: of their purpose, their regulatory basis, why each inspection is important, etc

Only, Then should you learn the acronym

ACRONYMS SPELLED OUT

ARROW (onboard documents)

Airworthiness certificate
Radio station license
Registration certificate
Operating limitations
Weight/balance

AV1ATE (inspections)

Annual inspection (12 calendar months)
VORs (30 calendar days)
100-hour inspection
Altimeter/pitot static (24 calendar months)
Transponder (24 calendar months)
Emergency locator transmitter (12 calendar months; or 50% battery or 1 hour of cumulative use)

SAFETY (briefing)

Seat belts
Air/ventilation
Fire extinguisher
Emergency procedure
Traffic
Your questions

NW KRAFT (preflight)

Notams
Weather
Known ATC delays
Runway lengths
Alternates
Fuel
Takeoff/landing distances

ATOMATOFLAMES (VFR day equipment)

Altimeter
Tachometer
Oil pressure gauge
Magnetic compass
Airspeed indicator
Temperature gauge
Oil temperature gauge
Fuel gauge
Landing gear position indicator
Anticollision lights
Manifold pressure gauge
Emergency locator transmitter
Seatbelts

Acronyms should always be the last thing you study. Never the first.

AVEMCO PIREP: 10 Bad Habits Other Pilots Have

January 2023

Bad habits can be insidious. Sometimes we don't even realize we have a bad habit until the resulting incident or accident occurs. We get along fine not using the pre-flight checklist until one day we're shocked to hear the sound of metal scraping along the runway.

Every flight instructor has a list of good habits they try to instill in their students, and a list of bad habits they try to help their students break. We heard from several flight instructors and these ten bad habits show up on everyone's list.

Underuse of the Checklist or Not Using One at All

If you're lucky enough to always fly the same plane, you get to know it like the back of your hand. But the more complex the aircraft is, the more there is to know. Then, one day, a distraction breaks your flow or stress makes it hard to remember every step of a process, and the next thing you know it becomes a bad day in the air.

Rushed Preflight

You won't find many pilots who don't conduct a preflight check, or who, at least, won't admit to that. But many rush through the steps they know because there have been no surprises in every pre-flight so far. Again, the more familiar you are with a plane, the more you know what to expect and the less you expect there to be anything different this time.

Multitasking While You Taxi

Flying is about soaring through the air, not crawling along the ground. That's the easy and boring part. It's tempting to save some time in the runup area by programming the GPS or autopilot while you're rolling along a straight line. Often that multi-tasking leads to broken taxiway lights and bent wingtips.

Impatience

You'll notice there's a common thread among the habits we've just listed: We fly planes because we want to go places and most of us like to go places fast. That kind of attitude can lead to not taking the time to use your checklist, blowing through your preflight or not concentrating as you make the long, boring drive to the runway which, incidentally, is why so many of us develop the habit of taxiing too fast.

Not Looking Outside the Aircraft

Most modern aircraft have a lot going on in the instrument panel. And glass panels can be downright mesmerizing with magenta lines to follow and the mountain of information and data put directly in our faces. In some cockpits, flying can feel a little too much like a video game, so make sure you take note of your surroundings.

Lackadaisical Use of Rudders

This is one of those bad habits that you develop early in your flying days and then it sticks with you until it feels normal and you don't even notice you're doing it. Lax rudder skills can make crosswind landings difficult or impossible. Uncoordinated turns can become stalls. So much of flying comes down to keeping the ball centered.

Not Thinking About the Call You Are Going to Make Before You Key the Mike

Be prepared to deliver succinct, clear statements to your partner in the sky – the air traffic controller.

Not Including All the Instruments in Your Scan
Regardless of whether you're flying with legacy-round instruments or the latest glass, the basics of instrument flying are still the same, starting with developing a thorough scan vs. a partial one. Once again, the more stuff happening on the instrument panel, the more things there are to keep an eye on.

Ham-Fisted Control
It's easy to not sense how tightly you're holding the yoke until you find yourself off course, off altitude, or having to constantly re-trim. A light touch is all you need to fly smoothly.

Complacency
More than one study has shown that the most dangerous time for a pilot isn't when they first get their certificate. It's about 1,000 hours down the road when things have gone smoothly and nothing major has gone wrong for all those hours. That's when many pilots start to relax and feel they've got flying down pat. Weight and balance can stretch a little bit. Vigilance can slip a little.

It's tough to stand back far enough to be able to see the bad habits you don’t think you have. It's harder, still, to commit yourself to unlearning some of those habits.

How do you unlearn a habit, anyway?
Here's advice on how to break a bad habit courtesy of Aviation Safety magazine from its April 20, 2021 issue. (Copyright 2021 Belvoir Media Group.)

Identify the Cue
Stress often is a trigger for a habitual response. As you become more familiar with the operation, it becomes less stressful and easier to identify.

Avoid the Cue OR Find a New Routine
Make it easier on yourself to break bad habits by avoiding the things that cause them. The earlier the bad habit is identified, the easier it is to avoid and/or replace it.

Expect a New Result
When you change your behavior/habit, expect a different result. Embrace the famous quote attributed to Albert Einstein—that insanity is doing the same thing over and over again and expecting different results—by changing your responses to the cue.

Cognitively Repeat Until a New Routine Becomes Habit
Habits are encoded into our brains and the only way to change them is to identify the habit's trigger. Take a different action and observe the new result.

Obtain a Clear Result That is Identifiably Better
It's hard to change a habit when the result of the new behavior isn't clear. Making better landings can be its own reward, for example.

boldmethod

Quiz: Are You Legal To Take These 6 Flights?

1) You're taking some friends up for a night flight. In the past 90 days, you've logged 1 night touch-and-go landing and 2 night full-stop landings in your plane. Can you take your friends up on the flight?

2) The following week, you want to take your friends up for a daytime flight. In the past 90 days, you've logged 2 night full-stop landings, and 1 night touch-and-go. Can you take your friends up on the day flight?

3) You got your 3rd class medical today, which also happens to be your 39th birthday. In addition to the remainder of this month, how long can you fly with 3rd class privileges? (assuming you have a flight review as well)

4) You've been hired as a ferry pilot, and you'll be delivering aircraft this week. What's the lowest class medical certificate you need for the job?

5) You passed your private pilot check ride today (congrats!). When will you need your first flight review so you can continue acting as PIC?

6) You've been flying a Piper Seminole (multi-engine aircraft) for flight training, and you've logged 23 daytime stop-and-go landings in the past 90 days. Can you take friends on a daytime Cessna 172 (single-engine aircraft) flight based on the multi-engine landings you've logged?

Use this link to take the Quiz
https://www.boldmethod.com/blog/quizzes/2022/09/are-you-busting-a-regulation-if-you-take-these-6-flights/

Easy Mental Math For Pilots

By Colin Cutler

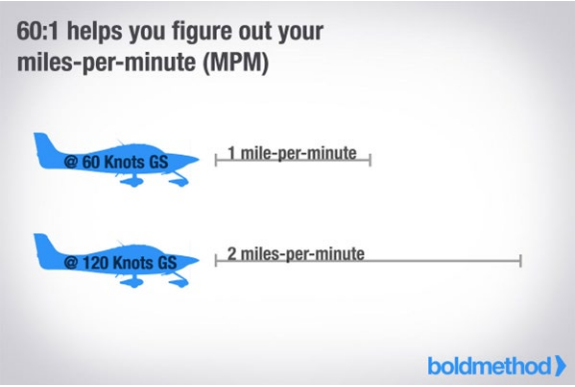
If you're like us, you probably don't consider yourself a math expert. Here are a few easy tips and tricks you can use to make mental math in the cockpit a little easier...

Key Points: To make your mental math a lot easier stick to using whole, **even rounded, whole numbers**

Descent Planning Mental Math

There are three basic steps to follow when planning your descent:
Step 1) How much altitude do I need to lose?

Step 2: How much time to reach the fix? This is a two-step process.
First, you'll figure out how many miles-per-minute (MPM) you're flying.



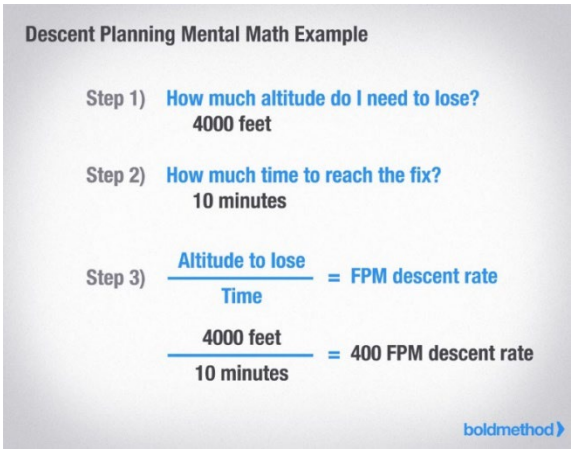
Think in multiples of 60. For example, let's say you're going 180 knots. 6 goes into 18 three times, so that's 3 MPM.

- 60 knots = 1 MPM
- 90 knots = 1.5 MPM
- 120 knots = 2 MPM
- 150 knots = 2.5 MPM
- 180 knots = 3 MPM

*Remember, these speeds are **ground speed**. When it comes to figuring out your MPM, ground speed is the only speed that matters.*

Now that you've got the "miles per minute value", let's look at how far you need to fly.

If you need to fly 20 miles, and you're flying 2 MPM, it'll take you 10 minutes to reach the fix (20 miles / 2 MPM = 10 minutes).

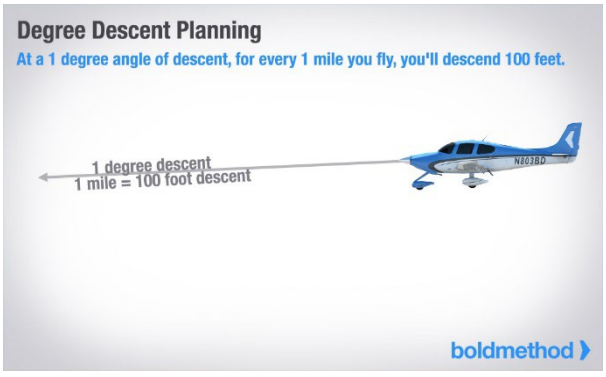


Step 3: Altitude to lose / Time = FPM Descent Rate... Here's an example of a calculated descent rate:

Other Uses For The 60-1 Rule

The basic rule says "at a 1 degree slope (or 1 degree on your attitude indicator or HSI), it's going to be 60 units horizontally for 1 unit vertically." But how else does this apply to your flying?

Descent Angles



If you know your flight path angle (FPA), which you'll often find in modern flight decks, the 60-1 rule can make mental math descent planning easy.

For every 1 degree of descent angle, you'll descent 100 feet for every 1 mile you fly.

For example, if you're descending at a 3 degree angle for 3 miles, you'll descend 900 feet.

The Little-Known Origin of the Word "Aviator."

Aviators come from a secret society of warriors that were formed around a thousand years ago during the time of the Mongol hordes led by a Turkish Leaders known as a Khan.

Subordinate to the Khan in the military chain of command structure of the Mongol hordes were the Khen's.

Khen is also of Turkish origin, although there is not a word in English that adequately conveys the meaning. Roughly translated, it means " One who will do the impossible while appearing unprepared and complaining constantly."

The most notable Khan, was the great Genghis Khan, who had ten Khens heading up the divisions of his Mongol Army.

Phu Khen, is considered by some to be the most under-recognized military officer in history. Many have never heard of his contributions to modern military warfare.

His abilities came to light during the Mongols' raids on the Turkistan city of Bohicaroo.

Bohicans were fierce warriors, and the city was well fortified. The entire city was protected by huge walls and the hordes were at a standoff with the Bohicans.

Bohicaroo was well stocked, and it would have been difficult to wait them out. Genghis Khan assembled his Khens and ordered each of them to develop a plan for penetrating the defenses of Bohicaroo.

So, Operation Achieve Victory, "AV", was born. Each Khen, from all 10 divisions submitted their plan. After reviewing AV plans 1 through 7 and finding them un-achievable or ridiculous, Genghis Khan was understandably upset.

Therefore, it was with much perspiration that Phu Khen submitted his idea, which came to be known as AV 8. Upon seeing AV 8, Genghis was convinced this was the perfect plan and gave immediate approval.

The plan was beautifully simple. Phu Khen would arm his AV 8ers to the teeth, load them into catapults and hurl them over the wall. The losses were expected to be high, but hey, hordes were cheap. Those that survived the flight would engage the enemy in combat. Those that did not? Well, surely their flailing bodies would cause some damage.

The plan worked and the Bohicans were defeated.

From that day on, whenever the Mongol Army encountered an insurmountable enemy, Genghis Khan would give the order "Send in some of those AV 8ers." Because he knew that he could always count on an AV8er to perform their best.

So, now you know the true origin of the word Aviator.

Young Eagle Flight

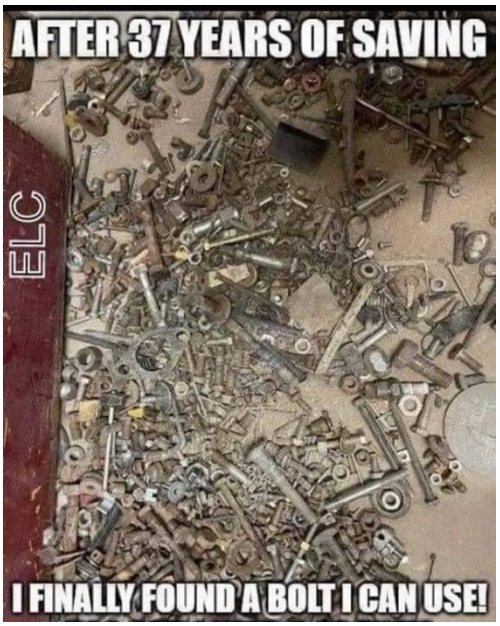
Mike Bishop gave a Young Eagle Flight to a young lady named Leilani on Saturday January 14th. Not to be left out, her mom enjoyed a flight also!!!!

February's Funnies

There are three simple rules for making a smooth landing. Unfortunately, no one knows what they are.

It's easy to make a small fortune in aviation: start with a large fortune

Everybody has a Hardware Bucket



A New Cessna Mod, for those extended legs

Aircraft Preventive Maintenance

This month, we will continue the discussion of Preventative Maintenance Items.

Lubricating Items Not Requiring Disassembly

There tends to be a belief that all lubricants are created equal and as long as a bearing, hinge point etc has some sort of lubrication, it will be fine.

To meet Manufacturer and the FAA Requirements

It's important to understand

What lubricant to use

When **you should** and **should not** use different types of lubricants

There are 4 types of lubricants:

Oil, **Grease**, **Penetrating Lubricants**, and **Dry Lubricants**.

The 2 most common lubricants are oil and grease

Oil is one of the most common lubricants. It's a thin liquid that;

Comes in different "weights" or viscosity, the lower the weight number, the thinner the oil.

Used in Engines, for lubricating hinge points, bearings in the flight control systems, etc

Grease

Is made by mixing oil, a thickener, and at times additional lubricants

The base oil is determined by the type of application the grease will be used for

Mineral oil based grease

Synthetic based grease

The thickening agent determines the grease consistency, that is its softness or stiffness.

The additives give the grease additional properties for specific applications

Greases are Designed for specific purposes and specific temperature ranges

As you can start to see,

It is important to use the correct grade grease for the correct use

A Grease should not be used unless specified for your aircraft

Greases should not be Mixed

Greases have different base oils, different thickeners, and/or different Additives

Mixing base oil types

Can affect grease seals

Mixing different thickener types

Result in poorer performance than either of the two original greases

Mixing Greases with different chemical makeups

Can Result in unwanted Chemical Reactions that result in creating an entirely new substance with Non-lubricating properties

If you use the same greasing equipment with one type and then switch over and fill it with another type of grease

Even a small amount of contamination between the two greases will produce a soupy mess that will probably run out and not properly lubricate that application.

It is best to have dedicated application equipment for each product.

To prevent possible failure of a component due to incompatibility or breakdown of the grease

1. Use only greases approved for use by the product manufacturer.
2. Never mix different kinds of grease without approval from the product manufacturer.
3. Follow the manufacturer's instructions or FAA approved process for cleaning, purging, and lubricating of the component.

Two of the most typically used Greases

***AeroShell Grease 5**

Wheel Bearing and Engine Accessory Grease

Combines high load-carrying ability with excellent resistance to water and high temperatures. Inhibited against corrosion and oxidation, with a useful temperature range of -18°C to +149°C. Used primarily in aircraft wheel bearings and engine accessories operating at high speeds and relatively high temperatures.

AeroShell Grease 6

General Purpose Airframe Grease

Inhibited against corrosion and oxidation, it features outstanding low-temperature torque properties and resistance to water. Useful temperature range of -40°C to +121°C. Used primarily in plain and anti-friction bearings on general aviation aircraft.

Note: In addition to using the correct Grease

When using a grease gun to grease a bearing serviced through a "Zerk Fitting," always

Ensure the Fittings are taking the Grease

Apply enough grease into the fitting for fresh, clean grease to be seen coming out of the bearing

This ensures that the bearing gets purged of the old, degraded grease

Which should then be wiped off to keep the area clean

Penetrating Lubricants

Penetrating oils are a very specific type of lubricant, intended for breaking loose rusty, corroded or otherwise "stuck" fasteners or components. These are very light oils, containing petroleum distillates, naphtha or other hydrocarbons, which have capillary or "wicking" properties to creep into small gaps and loosen frozen parts.

Question, are automotive/home type lubricants, such as WD-40, useable on an aircraft?? **The answer would be NO**

Even though, WD-40 is primarily a penetrating oil, it only temporarily provides a small amount of lubrication when first applied.

Other generic home lubricants

May contain ingredients that would be incompatible with aircraft use. Stay "wet" and eventually dry leaving a gummy residue that will attract dirt, dust, etc resulting in contamination and eventually may cause unexpected wear and tear of the component.

Examples of accepted Lubricants are:

LPS-1 Greaseless lubricant that penetrates quickly, displaces moisture, and will not attract dust or dirt.

- Provides a dry, thin, lubricating film
- Resists oil, dust, and dirt build-up
- Ideal for delicate mechanisms

LPS-2 Heavy-Duty Lubricant - The strong, oily film multi-purpose lubricant, and penetrant with added corrosion protection.

- Strong, multi-purpose lubricant, and penetrant
- Provides a non-drying, light, oily film for use on indoor/outdoor equipment
- Reduces wear caused by friction and corrosion
- Loosens rusted or frozen parts
- Strong, multi-purpose lubricant and penetrant with added corrosion protection

LPS-3 Rust Inhibitor - The long-term, waxy film, premier rust inhibitor; protects even in the harshest environment.

- Safe on all metals
- Safe to use on rubber, fabric, plastics, and paints
- Self-healing, soft, waxy film
- Provides non-sling lubrication
- Prevents rust and corrosion

Dry Lubricants (Such as Graphite)

Dry Lubricants are a great alternative when you can't use oil or grease that will attract dust and dirt. At a molecular level, the tiny particles that make up dry lubricant (like graphite) are super slippery.

Molybdenum sulfide (MOS2) and graphite are two of the most widely used active ingredients that make dry lubricants work wonders. Dry lubricants can be found in powered and in a spray form.

The bottom line is (As required by FAA Regulations) only use the products that are recommended by the manufacturer

As you should be aware, the Aircraft Maintenance Manuals contain lubrication requirements as part of a maintenance procedure and they provide lubrication information on Charts (See Examples that follow)

LUBRICATION CHART

ENGINE:

#30 winter, #40 summer. It is recommended the oil be changed every 25 hours of engine running time for maximum engine life. Detergent oil, Shell W, may be used if used consistantly from overhaul. For the first 25 hours however use non additive mineral oil to allow the rings to seat and allow the oil consumption to stabilize.

Control column & Rudder bearings : SAE #40 mixed with graphite.

Aileron pulleys : SAE #10

Wheel bearings : AN-G-5

Universal joints & control sprockets & chain : SAE# 10 oil.

Control column : Powdered graphite or Dow DC4 compound

Aileron bellcrank and hinges : SAE #10 oil.

Tail wheel axle bearing : AN-G-15

Door latches and hinges : Powdered graphite.

Tail surface hinges : Powdered graphite.

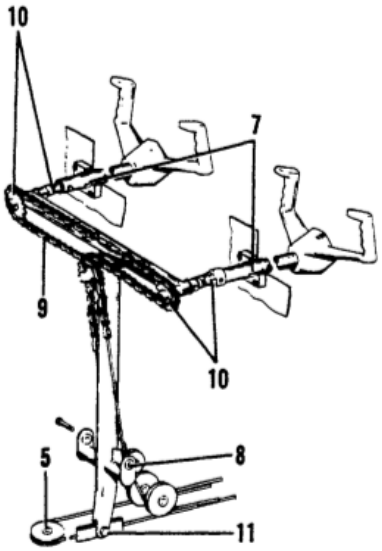
— *CAUTION* —

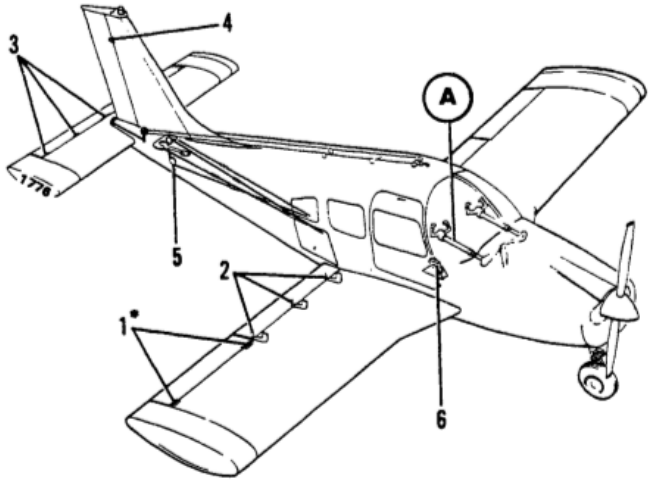
Do not lubricate control wheel shaft or bushing. Clean only using alcohol or other suitable solvent.

COMPONENT	LUBRICANT	FREQUENCY
1. AILERON HINGE PINS	MIL-L-7870*	100 HRS
2. FLAP HINGE BEARINGS	MIL-L-7870	100 HRS
3. STABILATOR HINGE PINS	MIL-L-7870	100 HRS
4. RUDDER HINGE BEARINGS	MIL-L-7870	100 HRS
5. CONTROL CABLE PULLEYS	MIL-L-7870	100 HRS
6. TRIM CONTROL WHEEL OR OVERHEAD CRANK	MIL-L-7870	100 HRS
7. O-RING, CONTROL SHAFT BUSHING	PARKER O-RING ** LUBRICANT	AS REQUIRED
8. TEE BAR PIVOT POINT	MIL-L-7870	100 HRS
9. CONTROL COLUMN CHAIN	MIL-L-7870	500 HRS
10. CONTROL COLUMN FLEX. JOINTS AND SPROCKET	MIL-L-7870	100 HRS
11. STABILATOR CONTROL	MIL-L-7870	100 HRS

SPECIAL INSTRUCTIONS

** Disassemble "O" ring retainer plates from instrument panel; lubricate "O" ring and reassemble (on 1.125 inch dia. shaft only).





SPECIAL INSTRUCTIONS

* Aileron hinges with teflon sleeves should not be lubricated. Aileron hinges without teflon sleeves should first be cleaned with a dry type solvent then lubricated with MIL-L-7870.

Figure 2-47. Lubrication Chart (Control System)

COMPONENT	LUBRICANT	FREQUENCY
1. AILERON HINGE PINS	MIL-L-7870*	100 HRS
2. FLAP HINGE BEARINGS	MIL-L-7870	100 HRS
3. STABILATOR HINGE PINS	MIL-L-7870	100 HRS
4. RUDDER HINGE BEARINGS	MIL-L-7870	100 HRS
5. CONTROL CABLE PULLEYS	MIL-L-7870	100 HRS
6. TRIM CONTROL WHEEL OR OVERHEAD CRANK	MIL-L-7870	100 HRS
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10. CONTROL COLUMN FLEX. JOINTS AND SPROCKET	MIL-L-7870	100 HRS
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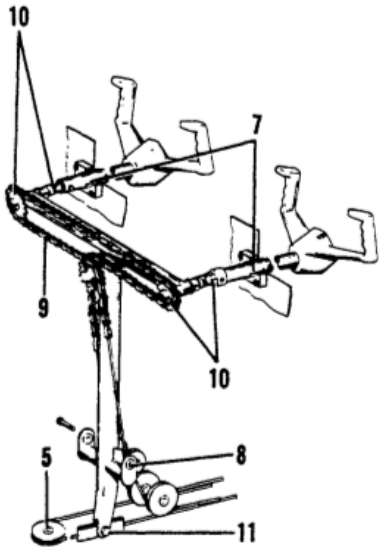
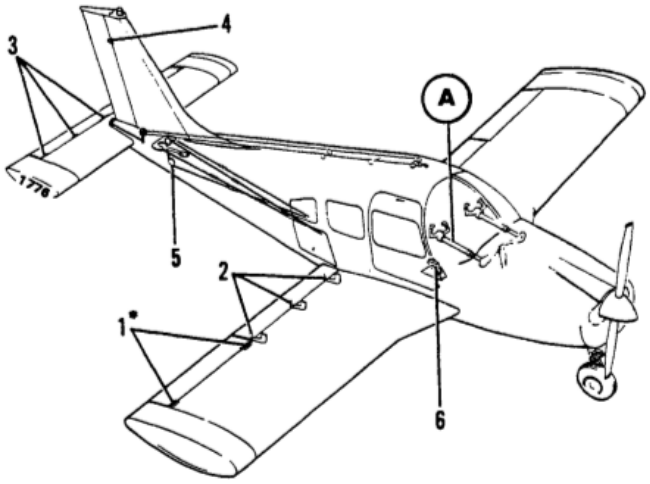
** Disassemble "O" ring retainer plates from instrument panel; lubricate "O" ring and reassemble (on 1.125 inch dia. shaft only).





SPECIAL INSTRUCTIONS

* Aileron hinges with teflon sleeves should not be lubricated. Aileron hinges without teflon sleeves should first be cleaned with a dry type solvent then lubricated with MIL-L-7870.

Figure 2-47. Lubrication Chart (Control System)

AVIATION ODDITIES

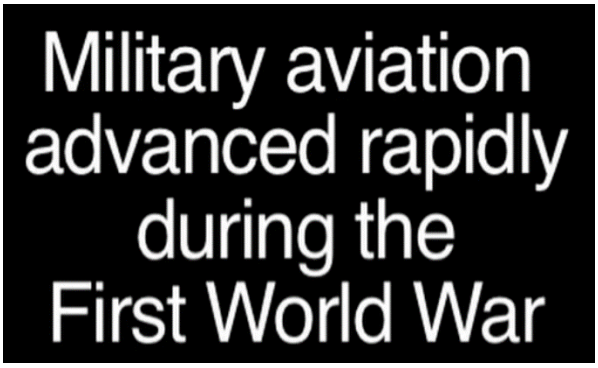
Origin and History of the Ejection Seat

The first successful ejection was in 1910 and was initiated by bungee cord.

Even so, an estimated 50,000 airmen died during the Great War from all nations, many of whom were stuck in doomed aircraft without any means of escaping.

It isn't well known but, rudimentary parachutes actually did exist in the early days of WW I.

But at the beginning of the First World War, both British and American senior officers believed that wearing them would reduce a pilot's determination to continue in aerial combat and make a pilot more likely to jump out at the first hint of danger. Resulting in too many planes being lost, so they never made chutes available.



https://www.youtube.com/watch?v=dwrIf_5gEEM

Doug Campbell, the first ace in American service, said "the pilots knew [parachutes] were being worked on but didn't know why we didn't have them…we would have been glad to have them."

Though during the same period men in observation balloons used them throughout the war to escape when enemy aircraft set their gasbags ablaze.

Finally, during the last six weeks of the war, German aviators donned them, and Eddie Rickenbacker reported seeing several deployed.

As for the allied commanders, it didn't sink in until a year after World War 1 ended that pilots were difficult to train and far more valuable than aircraft. At that point pilot's were issued parachutes.

Up through the 1920s, survival in an aerial emergency required the pilot to disconnect their seat belt and jump clear ("bail out") off the side of the aircraft before they could deploy their parachute and land safely. This method allowed rescue at speeds up to 250-300 mph.

As aircraft grew more powerful and capable of achieving ever greater speeds, the risks of simply bailing out over the side of the aircraft grew immeasurably. Which led to experimenting with ejection seats designed to rescue the pilot in an emergency.

In most designs, the seat was propelled out of the aircraft by an explosive charge or rocket motor, carrying the pilot with it.

The first ejection seat used in a practical sense was during a test flight of a Heinkel He-280 jet fighter on January 13, 1942.

After World War II, the need for such systems became pressing, as aircraft speeds were getting ever higher, and it was not long before the sound barrier was broken. Manual escape at such speeds would be impossible.

Britain's, Bernard Lynch, attempted the **first** static **ejection** on 24th January 1945.

He then conducted the **first** mid-flight **test ejection** on 24th July 1946. He ejected himself from the rear cockpit of a specially modified Meteor 3 at 320 mph, 8000 ft in the air.

https://www.bing.com/videos/search?q=First+ejection+seat+test&view=detail&mid=BB24655B37BF40CB8A4DBB24655B37BF40CB8A4D&FORM=VIRE

The Air Force had been struggling to figure out a safe way for pilots to eject at supersonic speeds.

Testing on the ground initially took place using American citizens recruited from the unemployment lines to act as test dummies.

The ejection system operated in two stages. First, the entire canopy or hatch above the aviator is opened, shattered, or jettisoned, and then a kind of cannon would launch the seat and it' occupant out of the aircraft.

The pilot would typically experience an acceleration of about 12–14g.

X-15 aircraft ejection seat tests, were conducted using the rocket sled track at Edwards Air Force Base, California, USA.

Testing of ejection seat systems and technology was moved to the Holloman High Speed Test Track (HHSTT) located at Holloman Air Force Base in New Mexico.

A view of the Holloman High Speed Test Track, looking from south to north

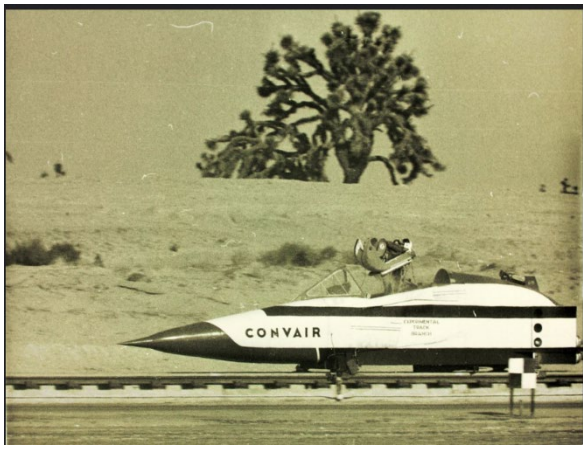
Tests on the rocket sled track provided data on problems that could not be solved by other ground test means.

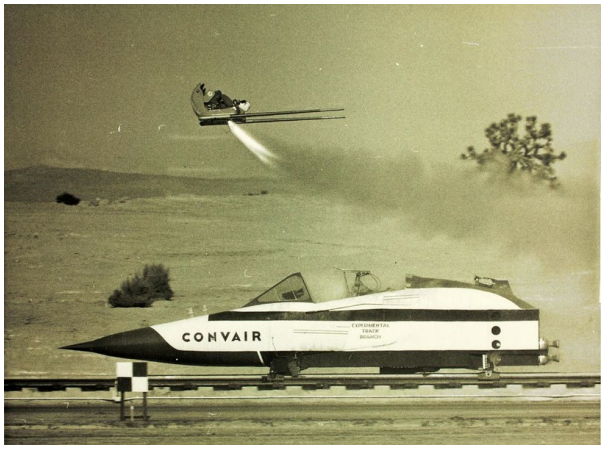
The tests are conducted by securing the ejection seat to a rocket-propelled sled and launching the sled to a speed identical to the speed a pilot would encounter during an actual flight.

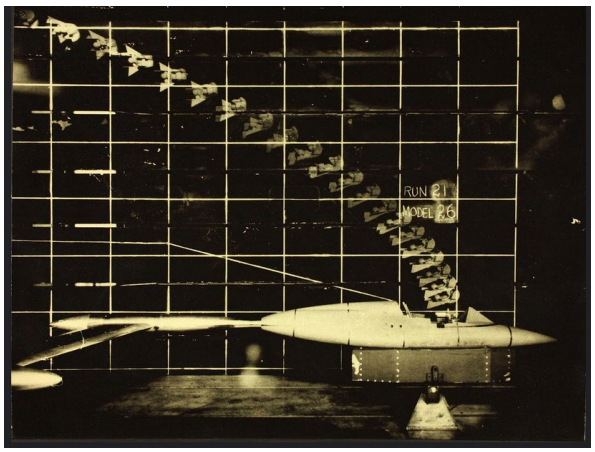
https://youtu.be/y6lvh82oWIw

Between 1950-1959, initial tests were conducted on the first aircraft to be fitted with rocket-propelled ejection seats.

The greater thrust of the ejection seats used in the Convair F-102 Delta Dagger had the advantage of being able to eject the pilot to a safe height even if the aircraft was on or very near the ground.







The 1950's, also saw the design and building of the nuclear bomb-carrying Convair B-58 Hustler capable of Mach 2 flight (traveling twice the speed of sound).

Moving at such speeds meant that pilots could no longer eject from their aircraft safely.

On March 21, 1962, a B-58 Hustler from the U.S. Air Force erupted in flames as a large, bright red capsule shot out of it, carrying a passenger to safety. But the passenger wasn't a pilot, and the plane wasn't crashing.

The event was a test of the B-58's experimental ejection capsules and the occupant of the capsule was a bear.

Rather than use people off the unemployment lines or crash test dummies they would simply drug up a bear and strap it into an ejector seat.

The idea was that the animals, six bears and a chimpanzee, would simulate the weight and size of a human pilot.

At first, the bears and other animals tested ejection seats and capsules on rocket sleds.

Once the Air Force was relatively sure of the design, they began flying the aircraft and ejecting the animals at altitude.

Most were fine, if a bit loopy, when they landed.

https://youtu.be/-KLnqorLgDM

Late in the Vietnam War, the U.S. Air Force and U.S. Navy became concerned about its pilots ejecting over hostile territory and either being captured or killed.

Both services wanted ejection seats that would fly the pilot to a location far enough away from where they ejected that they could be safely picked up.

So the Air Crew Escape/Rescue Capability or Aerial Escape and Rescue Capability (AERCAB) program was created to explore the possibility. Three companies submitted papers for further development but the AERCAB project was terminated in the 1970s with the end of the Vietnam War

The design and limitations of these early seats resulted in ejections that could only be performed above minimum altitudes and airspeeds.

Which brings us to the next evolution in the development of ejection seats, the design and testing of a zero-zero ejection seat.

The zero-zero (i.e., zero altitude and zero airspeed) capability was developed to help aircrews escape upward from unrecoverable emergencies during low-altitude and/or low-speed flight, as well as ground mishaps.

Parachutes require a minimum altitude for opening. The ejected pilot must be high enough to allow enough time for the chute to open slowing the pilot's rate of descent before hitting the ground.

In the mid-1960s Weber Aircraft had made its name providing ejection seats and egress technology to both the military and to NASA decided that animals and instrumented dummies did not provide all the information needed.

They felt that certain questions of human physiology needed to be answered by a test of a live human. In late 1965, Jim Hall a professional parachute safety instructor and Major in the Air Force Reserve volunteered to act as the human guinea pig for the 0-0 seat package.

He was instructed in all facets of the seat operation. In the tradition of the day, he visited the assembly line and selected the particular seat he would later ride.

A lake was selected not far from the factory for the test. A set of seat rails were attached to a test stand. The date and time were selected. And then it was time.

He was strapped into his chute and assisted into the seat. All the straps were connected and tightened. The engineering cameras were armed to record every aspect of the test, even the slump of Jim's shoulder markings under launch acceleration. Then the engineers withdrew to a safe distance. The rescue launches on the lake were signaled, and the countdown began...

Major Hall gripped the handles built into the sides of the seat bucket and pulled them up to the firing position... and nothing happened... for one long second.

The delay cartridge allowed the high speed cameras to get to speed and then the hot gas was unleashed into the catapult initiator.

The Major rose up the rails with an onset rate of 150 g's/second with a maximum of about 14g's. The rocket ignited as the seat cleared the rail providing the huge jet of flame.

One second and almost 400 feet later, seat separation occurred. The parachute gun fired, and two seconds later the parachute was fully inflated. The survival kit automatically released and dropped to the end of its lanyard. The rubber raft, suspended from the same lanyard, immediately inflated.

Approximately 26 seconds after Major Hall pulled the handles he landed in the lake.

To this day, thirty-three years later, Jim Hall's zero-zero ejection test remains the only 0-0 test that was executed with a human subject in the United States by an American Company.

Modern zero-zero technology uses a seat cannon to clear the seat from the aircraft, then an under-seat rocket pack fires to propel the seat upward to a sufficient altitude at which a small explosive will open the parachute canopy.

Rocket Sled Test At USAF High Speed Test Track
https://www.youtube.com/watch?v=vaWoLoP4hI0

Aircraft Ejection Statistics

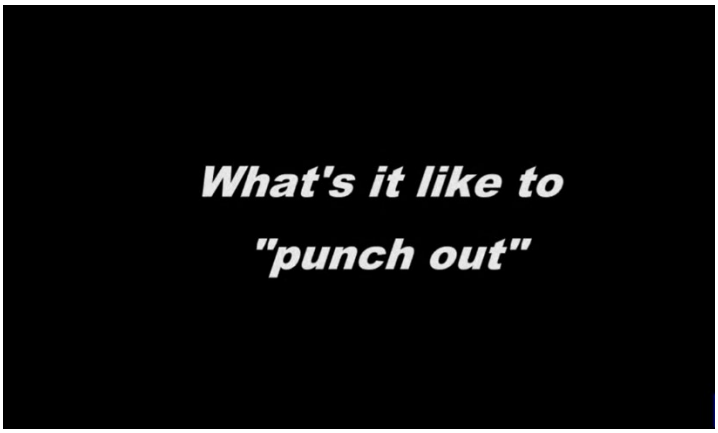
Depending on altitude and airspeed, the seats accelerate upward between 12 and 20 Gs.

The interval between ejections in a two-seat plane like the F-14 Tomcat is about half a second.

Ejection seats have saved more than 7,000 people.

https://www.bing.com/videos/search?&q=This+is+how+ejector+seats+for+jets+are+tested!!&docid=608031541300719203&mid=AD3BC9EF655D3B3D9D42AD3BC9EF655D3B3D9D42&view=detail&FORM=VIRE&form=VDRVSR&ajaxhist=0

Six pilots have ejected at speeds exceeding 700 knots (810 mph).



https://www.youtube.com/watch?v=vBdcNdKxTs8

Two pilots ejected at Mach 3.25 at an altitude of 80,000 ft

Despite these records, most ejections occur at fairly low speeds and altitudes, when the pilot can see that there is no hope of regaining aircraft control before impact with the ground.

An example was caught on video as Thunderbird Pilot Capt. Christopher Stricklin ejects from his F-16 aircraft with an ACES II ejection seat on 14 September 2003 at Mountain Home AFB, Idaho. Stricklin was not injured.

https://www.youtube.com/watch?v=oUNhg9y2i6o
https://www.youtube.com/watch?v=93IahoIKAQo

When ejection seats fail, they fail big.

Ejection seat inadvertently misfired, launching crewmember partially through the canopy.

In July 1991, on a routine hop over the Indian Ocean, Grumman KA-6D navigator/bombardier Lieutenant Keith Gallagher's seat inadvertently misfired, launching him partially through the canopy.

Only his parachute, streaming back to wrap around the aircraft tail, kept his semi-conscious body from flailing in the wind or dying by impalement on the jagged canopy during landing.

Post-incident analysis revealed the seat's 28-year-old firing mechanism had fatigued. Since then, every Navy seat goes through routine, scheduled inspection.

Three crew members of a Russian heavy bomber were killed when their ejection seats fired without warning.

The seats weren't designed to save the crew at ground level, and their parachutes failed to open in time. Early reports suggest the seats fired when the aging bombers' engines started up

Ejection Seat didn't fire during an inflight fire

During an attempt to eject from an Air Force B-1B Lancer experiencing an engine fire. The first crewmember pulled the ejection seat handles the hatch above his position exploded off the aircraft. But the ejection seat did not fire.

Which meant the Offensive Systems Operator was sitting on an ejection seat with the firing pins pulled that could fire at any time.

Within two seconds of knowing that had happened the aircraft commander says, 'Cease ejection. We'll try to land."

The aircraft commander declared an emergency and flew the B-1B the entire way to Midland International Air and Space Port between Midland and Odessa, Texas while it was on fire with a missing hatch, had no cockpit pressurization and an armed ejection seat that could fire at any moment without warning.

The crew safely recovered the aircraft to Midland without injury or further damage to the aircraft, saving every member on board and the 400 million-dollar B-1B.

The B-1 incident led to a temporary stand-down of the whole B-1 fleet as all ejection seats were inspected.

A “crimped” part was found that prevented the signal from reaching the ejection seat

Parachute failed to deploy after ejection

F-16 Fighting Falcon pilot at South Carolina’s Shaw Air Force Base, died June 30, 2020, when his ejection seat malfunctioned as he tried to escape from a failed nighttime landing.

The ejection seat shot 130 feet into the air but failed to deploy its parachute. The airman hit the ground about seven seconds later while still strapped into his seat.

Investigation into the mishap revealed there were faulty electronic parts inside the sequencer which controls the ejection process.

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Plane Dealing (Want-Ads, Lost & Found & Notices)

Interesting and Useful Websites:

NOTE: You may have to copy and paste the address into your browser if the link doesn't work

If anyone knows of other interesting websites let me know and I will add them to the list

Our Chapter Home Page: **https://chapters.eaa.org/eaa1321**

https://www.facebook.com/groups/822162418913584

http://www.eaa.org/eaa

https://www.faasafety.gov/

FAA Safety Briefing Magazine | Federal Aviation Administration

Weather and Flight Planning Sites:

https://www.lmfsweb.afss.com/Website/home#!/

FltPlan.com Free Services

www.avweather.com

www.skyvector.com

www.airnav.com

www.flightaware.com

Miscellaneous Links To Check Out:

http://www.avweb.com/

http://aero-news.net/

http://tailwheelersjournal.com/

www.whywefly.org

www.barnstormers.com

Travel:

http://www.socialflight.com/search.php
www.funplacestofly.com
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www.100dollarhamburger.com
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