FLIGHT CHOPS

PRACTICE REVIEW IMPROVE

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GRASS ROOTS

Prevention is NO ACCIDENT!

Thank you for downloading this PDF, the expanded explanation document that goes along with the FLIGHT CHOPS video that was filmed in Nashville, Tennessee in December of 2019.

This series of videos is a collaborative effort between myself and Steve Thorne, the content creator of the Flight Chops Channel. After very positive reviews and industry appreciation for our first video, https://youtu.be/m_tKShlf_gUn released in September of 2019, our idea was to continue the series on an infrequent and unscheduled basis where we continue to practice and review the concepts so important to the GA flier that could help reverse the GA fatal accident trend.

The NTSB data for GA was not good in 2018 showing a large spike upwards in Fatal accidents per 100,000 flight hours and total deaths. The 2019 data is equally bad as summarized manually using NTSB data. The first month of the year 2020 is already very much in excess of the average number of fatalities per month.

What is Grass Roots? What we found interesting about that September Flight Chops video was the comments! Comments on YouTube videos are fairly traditional across the board on types of comments. The September video had unusual comments that had the theme of not only using the content for personal betterment, but the stated intent to share the content with others, so that others could also benefit from it.

This is Grass Roots. This is everyday pilots taking information and absorbing it on a volunteer basis. *We* in GA do not want or need new government regulations regarding our freedom to fly. *We* need increased awareness, increased sharing, increased caring, increased interest in self-preservation, and increased emphasis on PREVENTION. Prevention is no accident.

Here are just a few of the comments from actual pilots in the comments section of the September 2019 video that exemplify the Grass Roots theme of pilots helping pilots! The following amazing un-solicited action words such as Sharing, Sending, Forwarding, Passing it on, Showing, Presenting, Adopting, Using, Applying, Incorporating and Modifying were lifted from the comments section and they tell us that you are very receptive to voluntary awareness education!

I shared it to my favorite local FB page

This was an excellent video! Since I started flying, I've lost one friend per year here in Alaska due to a loss of control accident. I'm making a new sticker line and adding it to my airspeed indicator for minimum maneuvering speed and I'm going to start practicing my go-arounds and engine failure procedures on a regular basis. I did it during my initial training and have gotten away from doing it consistently. Thank you for this video. I think it was your best one yet! I shared it to my favorite local FB page Flyout Alaska, and I hope others will take the time to watch. Excellent content! THANK YOU!

I have shared this very important video

I have shared this very important video with my flying friends and RV flyers group on fb. I've watched it about 12 times in the last day and a half. This weekend: I'll go fly my RV6a, check my indicated clean stall speed, apply Dan Gryder's 1.404 Defined Minimum Maneuvering Speed factor and placard my ASI with a colored stripe. VS x 1.3 is still my speed down finals and over the fence but DMMS (VS1 x 1.404) is my minimum go around and get out of trouble speed. Thank you Dan and Chops.

I will share this video

As the President of a type club for the last 19 years I will share this video with my 450+ members. I have lost 5 friends in 4 accidents that succumbed to this very scenario. Thanks, and “Keep up the good work.”

I'm sharing with everyone

Man, this is one of the best videos. I learned a lot and I'm sharing with everyone who is into aviation. Thanks for sharing this content.

Surely sharing it with friends

One of the best videos according to me. it’s a definite must watch for all pilots. Surely sharing it with friends to make us all safer pilots. Thanks for having great, interesting, informative, eye opening content.

Just sent this to my CFI

Just sent this to my CFI. He loved it. Said he intends to play it for all the pilots at our next flying club meeting.

I'm sending it to my instructor

Very impactful video. I'm sending it to my instructor so we can talk about doing the minimum airspeed and engine failure procedures.

I have forwarded him this link

This is a great service to GA pilots. Thanks SO much!! I was never oriented to Minimum Maneuvering Speed, but I did get training and practice on the immediate push, although not with the repeated conditioning. Thanks so much!! My son is about to start flight training and I have forwarded him this link with the admonition: "This video may save your life someday... practice it!"

This will be passed on to my future students
Been following this channel since my early days of getting my PPL in a 7ECA Citabria, and now as I’m nearing my CFI check-ride I feel this is some of the most important and pertinent content I’ve ever seen on this channel. Thanks Steve for recording this, and thanks Dan for sharing your wisdom and knowledge. Please know that this will be passed on to my future students as well and that I will also be storing this essential information in my mental toolkit as well! Hope you also enjoyed my home state of Georgia as well Steve! Will pass on to all my flying friends and the flying school I use.

Brilliant!! Great video, will pass on to all my flying friends and the flying school I use. Definitely worth drumming in the reaction to naturally push to maintain the speed, and I liked the get light in the seat! Thanks again Steve!!

Will gladly show this to advanced students!

This is one of the best aviation training videos I've seen! Working on my CFI right now and will gladly show this to advanced students!

Requesting permission to present your video at EAA VMC Meeting and as a FAASTeam Representative would also like to present at WINGS Programs. I think this is a must see for every GA pilot! Thank you

I've adopted this philosophy.

Having blasted through 30 hours of my ppl training this past month and a half, with a check ride right around the corner, since y'all dropped this video, I've adopted this philosophy. I pretty much constantly think about this video.

That's the best half hour that I have spent in a looong time! I felt the power loss every time the throttle was pulled. The 1.404 times stall placard is genius. Hopefully that will be adopted by GA as a lifesaving measure.

We used this video as the focus of our discussion at the most recent Baltimore area chapter meeting of the EAA IMC Club. Well done Flight Chops!

I have to say...this video changes everything. I always thought I'd shove the yoke forward with a dead engine, but wondered how much time would tick off before trouble starts. Now I know you must act immediately. All the tips shown here will be applied to my training and flying. This, I believe, is a game changer. I'm confident it will save lives if people fly this way. Thanks to both of you!

Thank you Steve! Maybe your best video yet. Looks like this should become standard curriculum for flight training. I will be applying this new knowledge in future flights.

This episode played a lot like the older ones, and turned out to be a fantastic learning experience. I'll be a CFI soon at a 141 flight school, and all my students will be learning this.

This is one of the most important videos I've ever watched! Went flying yesterday and incorporated each of these lessons in my planning, procedures, and conscious thoughts. Thank you thank you THANK YOU!

Excellent video and something I'm going to incorporate into my checklist and regularly practice. Thanks for sharing.

Like it!!! I'm going to modify my instructions to include these concepts...keep it coming!!!

Very good Steve. I will be modifying my checklist and calculating my DMMS!

Great video I'm gonna edit my checklists and take some tape to the airport! I gained a lot from your video! Thank you.

The latest data that summarizes 2018 and 2019 General aviation accidents shows a sharp increase in the actual number of fatal General Aviation accidents. We believe that an overall benefit may be obtained through the creation of this series that may be viewed and shared on a volunteer basis among flight schools, CFI's, clubs, chapters, and individuals. Mostly using social media as a sharing platform and employing the volunteer viewer that can help us by sharing the content locally in their own environment.

The first video was filmed near Atlanta, Georgia. The next was filmed near Nashville, Tennessee and the next one after that (and all subsequent efforts) is open for ideas as far as location! If you have a suitable airport and at least four pilots with four different aircraft (single or multi, nose wheel or tailwheel) that would be open to receiving a free GA AQP AFR at your airport, then we want to talk to you! An AQP AFR counts as a flight review! If you participate, you agree to let us brief, fly, and debrief, and use the content captured to illustrate the training concepts common to us all. We all make mistakes, and capturing your mistakes and lessons learned is not intended to belittle the participant in any way! We are looking for good pilots that are not afraid to say on camera "I did not realize that, and my awareness has been increased!"

So…What exactly is an AQP AFR?

The airlines and most 135 operators of large aircraft operate their own training and testing (all simulator based) under a program called AQP, or Advanced Qualifications Program. Under AQP, each airline gets to decide what to train, and what is on the oral, and what is on the check ride! This is an amazing difference between GA and AIRLINES! These are not check rides like you have ever seen before. The airline record is impressive, (see enclosed summary sheet) as they now train and check all the possible scenarios (called maneuvers) known to be problematic over the course of time.

https://www.faa.gov/training_testing/training/aqp/more/

As an example, here is a chart showing checkrides for the two groups, what is typically on them, and what is not on them.

Task	General Aviation	Airlines
Power on stall	Always	Never *1
Power off stall	Always	Never *1
Cross control stall	Sometimes	Never *1
Accelerated stall	Always	Never *1
Spin recovery	Sometimes	Never
Slow flight	Always	Never
Steep spiral	Always	Never
Chandelles	Always	Never
Lazy eights	Always	Never
Steep turns	Always	Never
Short field takeoff	Always	Never
Soft field takeoff	Always	Never
Short field landing	Always	Never
Soft field landing	Always	Never
Eights on pylons	Always	Never
Eights around pylons	Always	Never
Emer desc	Always	Sometimes
Emer landing	Always	Sometimes
Preflight preparation	Always	Always
ADM	Never*2	Always
Before Taxi Check	Never	Always

Task	General Aviation	Airlines
Preflight briefing	Never*3	Always
Rejected Takeoff (RTO)	Never*6	Always
I-IMC ATO	Never*4	Always
U-IMC ATO	Never	Never
LOTOT	Never*6	Always
Inadvertent IMC / SD	Never	Never
Terrain Avoidance/CFIT	Never	Always
In Flight Loss of Vacuum or PFD	Never	Always
Autopilot failure in flight	Never	Always
DMMS usage	Never	Always
Abnormals in flight	Never	Always
Stabilized app	Never*5	Always
Go arounds	Always	Always

Note *1 Some airlines recently have adopted EET or extended envelope training where stalls and unusual attitudes may be trained.

Note *2 ADM is mentioned by FAA as being constantly evaluated in each task for all tasks but Never as an individual task.

Note *3 Pre-Flight verbal “self” briefing as a final review of plan, course, and contingency for single pilot GA ops is not required.

Note *4 I-IMC ATO is found on the Instrument Pilot ACS, but not private.

Note *5 Stabilized approach is mentioned in FAA ACS and PTS but Never defined as to how to use it, what the definition of it is, nor is it ever checked as a specific task.

Note *6 ASEL only

We find that under AQP, the Airlines have custom built their own training and check rides to match possible accident scenarios, and be fully ready for each. General aviation continues to place emphasis on the review of unrelated maneuvers that have no connection with time critical real-world accident scenarios.

AQP AFR is a General Aviation, Advanced Qualification Program, Annual Flight Review. Is that legal?

Since the FAA requirement of completing a flight review only specifies: "a review of those maneuvers and procedures that, at the discretion of the person giving the review, are necessary for the pilot to demonstrate the safe exercise of the privileges of the pilot certificate."

It implies that there is a lot of discretion for custom building your own training program unique to your own aircraft and your own type of flying. The FAA provides an AC 61-89D that actually encourages the custom design of an individual program:

Currency Criteria. Pilots should design a currency program tailored to their individual operating environments and needs, which should emphasize proficiency beyond the minimum currency requirements. In most cases, pilots may integrate currency criteria with normal operations to reduce the need for separate currency flights. For example, pilots could incorporate additional takeoffs and landings, instrument approach procedures (IAP), or specialized takeoffs and landings, such as short or soft field, into a planned flight. In most cases, pilots should consider the need for currency beyond that specified by 14 CFR 61.

About AQP AFR: It is voluntary! There is no requirement to participate. If you want to participate and train to an advanced level, you can have any CFI fly with you and use this guide for preparing for and taking the AQP AFR. What happens if you fail? Nothing! If you fail any maneuver on the AQP AFR, you become aware of an area that you are deficient in, and you have the opportunity to do more study, practice, review and Improve!

<u>Here is a sample profile for a GA AQP AFR</u>

- ✓ Preflight Preparation
- ✓ ADM
- ✓ Before Taxi Check
- ✓ Preflight Briefing
- ✓ Rejected Take Off
- ✓ I-IMC ATO or U-IMC ATO
- ✓ LOTOT (either single or twin)
- ✓ SD –D or SD-N
- ✓ Terrain Avoidance
- ✓ Loss of AHRS in Flight
- ✓ Auto Pilot Failure
- ✓ Loss of Speed Awareness
- ✓ Mis Handled Abnormal in Flight
- ✓ Stabilized Approach
- ✓ Messed up Go-Around's

For the ground portion of the Grass Roots video, here is the AQP AFR question bank that we used. The questions were designed to drive the student to think about how things have been done in the past, and whether or not we are truly adequately prepared in GA.

PREFLIGHT PREPARATION AND ADM

- What is Preflight preparation?
- What is ADM?
- Which is more important? The planning part, or the decision-making part?
- Is PREFLIGHT PREPARATION a heavily emphasized FAA check ride task?
- Is ADM a heavily emphasized FAA check ride task?
- Which is more likely to cause a fatal GA aircraft accident? Poor preflight preparation or poor decision making?
- How prevalent are fatal GA accidents due to poor ADM?
- Is the task ADM on any FAA checkride?
- As is, are we in GA adequately prepared for ADM?

BEFORE TAXI CHECK

- Does your plane have a BEFORE TAXI checklist?
- Do you normally perform a before taxi check after start, and before moving the plane?
- What is the importance of having a BEFORE TAXI check?
- Does the FAA ever train you or check you on the task called BEFORE TAXI CHECK?
- How prevalent are GA accidents, incidents, or runway incursions due to distracted pilots trying to taxi and work at the same time?
- How prevalent are fatal GA accidents due to skipped or missed checklist items?
- Is the task BEFORE TAXI CHECK on any FAA checkride?
- As is, are we in GA adequately prepared for BEFORE TAXI checklist usage?

PREFLIGHT BRIEFING

- Even while flying single pilot, what is the value of a good Pre-Flight Briefing and or self-briefing?
- How prevalent are fatal GA accidents due to missing, or no self-briefing, and not having a plan B?
- Is the task PRE-TAKEOFF BRIEFING on any FAA checkride?
- As is, are we in GA adequately prepared for PRE-TAKEOFF BRIEFING?

REJECTED TAKE OFF

- During takeoff, is it possible to need to REJECT the takeoff?
- What are some valid reasons for a REJECT prior to liftoff?
- Is there such a thing as a REJECTED TAKEOFF on any FAA single engine checkride?
- Does the FAA ever require you to plan for a REJECTED TAKEOFF?
- How prevalent are fatal GA accidents due to faulty RTO?
- Is the task RTO on any FAA checkride?
- As is, are we in GA adequately prepared for a surprise RTO?

I-IMC ATO / U-IMC ATO

- During periods of low ceilings and visibility, what is the most shocking sensation to a pilot not prepared to enter the clouds?
- Describe the pilot workload or some items that might need to be done as soon as the wheels leave the ground under these conditions?
- What is the primary cause of fatal accidents immediately after takeoff and upon entering clouds? (either I-IMC ATO or U-IMC ATO)
- Does the FAA place very much emphasis on these maneuvers?
- How prevalent are fatal I-IMC ATO or U-IMC ATO GA accidents?
- Is the task I-IMC ATO OR U-IMC ATO on any FAA checkride?
- As is, are we in GA adequately prepared for I-IMC ATO or U-IMC ATO?

LOTOT (either single or twin)

- In your experience, which has been more emphasized by FAA in both training, and check-rides? Stall recoveries or stall avoidance?
- The stall recovery on ANY checkride always involves using two basic elements in order to recover. What are those two basic elements?
- Have you ever been taught to practice a stall recovery without the use of power?
- Is a power not available stall recovery mentioned in any FAA training, ACS, or PTS that you know of?
- When you practice stalls, and stall recoveries for training or a checkride, what altitude do you normally use?
- In real life, and based on GA fatal accident data, what altitude does a fatal stall progression normally start at? Above 1000 AGL or below 1000 AGL?
- Even if you were extremely sharp and proficient, could you reasonably expect to recover a full stall and spin from below 1000 AGL?
- If you are not expecting an engine failure on takeoff, how much time can you expect to lose before you are able to process the event and respond due to startle factor?
- If a pilot loses thrust (engine out) on takeoff below 1000 feet and enters stalled condition, will he/she be fully trained by FAA required training and testing to recover without the use of power?
- Does it make sense that we as pilots solely train and test up high, (with someone telling us that we are about to stall, and that power is available for recovery) and we then get into trouble without an instructor, surprised, down low, and without power available?
- During any takeoff, what is your highest risk?
- How prevalent are fatal GA accidents due to LOTOT?
- Is the task LOTOT on any FAA checkride?
- As is, are we in GA adequately prepared for LOTOT?

SD –D or SD-N

- What is spatial Disorientation?
- Have you ever been given specific dual instruction for any rating on a task called SD?
- Have you ever had SD be tested as a task on any checkride?
- On any checkride, when you are given the task of unusual attitude recovery by an examiner, are you wearing a view limiting device for this task?
- For a checkride, when you are asked to recover from an unusual attitude, where are you expected to look? Inside at the panel, or outside at the horizon?
- If you were flying VFR and heard a controller tell you to "Maintain VFR" what does the V stand for?
- If you were flying VFR and accidently got yourself into IMC conditions and a controller told you to "Maintain VFR", would that cause you to want to look inside at your panel, or want to look more outside to stay visual?
- Have you ever been flying and heard a controller say anything like: "I know you're VFR only, but don't look outside. Get on those gauges and fly wings level. I'm going to help you. Even if you fly through a cloud it's OK, I got you covered. Concentrate on wings level and steady."
- Does it make sense then, that we as pilots solely train and test with a hood on, and with an instructor or examiner reminding us to stay on instruments. But we get into trouble without an instructor, without wearing a hood, and ATC is telling us to stay visual?
- What happens if you fly VFR into a cloud without being IFR and the FAA finds out?
- If you are in flight and you declare an emergency, is there a penalty?
- What liberties do you have available as soon as you declare an emergency?
- Is there a regulation that says this in writing?
- Do you think that pilots are generally fearful of declaring an emergency in flight?
- Upon entering clouds, (either on purpose or inadvertent) what are your flight priorities?
- How prevalent are fatal GA accidents due to SD?
- Is the task SD-D or SD-N on any FAA checkride for GA?
- As is, are we in GA adequately prepared for SD-D or SD-N?

TERRAIN AWARENESS

- What is C-FIT
- What does the C stand for in C-FIT?
- All crashes end up crashing into the earth somehow, there are only two ways to do this. If C-FIT is one of them, what must the other be?
- What is the main difference between C-FIT and U-FIT?
- Since all controls are working normally in C-FIT, it must be the pilots incorrect positioning of those controls that steers a plane into something solid and not moveable. What can pilots use to avoid CFIT accidents?
- How prevalent are fatal GA accidents due to C-FIT?
- Is the task C-FIT / TERRAIN AVOIDANCE on any FAA GA checkride?
- As is, are we in GA adequately prepared for C-FIT / TERRAIN AVOIDANCE?

LOSS OF AHRS IN FLIGHT

- What happens when a vacuum system fails in flight?
- What instruments are normally lost with loss of vacuum or PFD?
- Is it possible to stay upright during a loss of primary horizon and heading info while in the clouds?
- Would you declare an emergency for this?
- Do you have any portable device that could help with this situation?
- How prevalent are fatal GA accidents due to loss of VACUUM or PFD in flight?
- Is the task LOSS OF VACUUM OR LOSS OR PFD IN FLIGHT on any FAA checkride?
- As is, are we in GA adequately prepared for loss of vacuum or PFD in flight?

AUTOPILOT FAILURE IN FLIGHT

- Are you normally fully prepared to fly the plane without an autopilot?
- If you were in IFR and lost the autopilot, would you declare an emergency?
- If you had to shoot a low approach without an autopilot but you were used to having the autopilot do it for you, would you tell ATC or declare an emergency for this approach?
- How often do fatal accidents occur where a simple autopilot failure led to an accident?
- Is AUTOPILOT FAILURE IN FLIGHT on any FAA checkride?
- As is, are we in GA adequately prepared for autopilot failure in flight?

LOSS OF SPEED AWARENESS

- What is DMMS
- What is this number (speed) for your airplane?
- Without calculating this for yourself, is this speed published anywhere in your POH for your airplane?
- Does having this number calculated and placarded on your airspeed indicator help to remind you of the min speed to fly that will always give you that 30% stall buffer?
- The DMMS speed is 1.404 x Vs1 for most GA planes. What three things does this DMMS speed represent that are very useful to a pilot both in normal and abnormal scenarios?
- While turning base to final at a 30 angle of bank in your plane and holding altitude in the turn, if you are flying exactly the DMMS speed, what percent above stall should you still be even if you have no flaps out yet?
- Once on final, is it OK to go below DMMS?
- What is FAA recommendation for speed on final when fully configured?
- How often do airliners stall and spin and crash due to low speed condition?
- How often is the low speed condition a cause of fatal accidents in the pattern for GA?
- Is DMMS usage on any FAA checkride?
- As is, are we in GA adequately prepared for “preventing” a low speed condition via DMMS usage?

MIS HANDLED ABNORMAL IN FLIGHT

- What is the definition of an abnormal?
- What is the main danger of any abnormal, no matter how insignificant?
- Can you name three types of levels or urgency for landing while in flight?
- Do you have a memorized list of items that would cause you to declare an emergency?
- If you need to land fast at the nearest airport, would you turn the plane first in the direction of an airport, or declare an emergency first and wait for permission to turn?
- How many fatal accidents are caused by pilots that never declare an emergency and never point towards a suitable landing area?
- Is the definition of an Abnormal on any FAA checkride?
- Are the three levels of urgency on any FAA checkride?
- As is, are we in GA adequately prepared for abnormals/emergencies?

STABILIZED APPROACH

- What is the definition of stabilized approach according to the FAA?
- What are the two gates often used for determining stabilized or not?
- If you are not stabilized on time, what will the result likely be?
- If you are not stabilized in time, what should you do?
- How many fatal accidents are caused by unstable approaches?
- What is PIO?
- Of these five landing goals, which one of these is least important to you:
  landing on speed, 2) landing in TD zone, 3) landing on centerline, 4) Staying on glide path, 5) squeaky landing
- Is there a task called squeaky landing on any FAA checkride?
- Is the task Stabilized Approach on any FAA GA checkride?
- As is, are we in GA adequately prepared by FAA to make stabilized approaches without PIO?

MESSED UP GO-AROUNDS

- What are some dangers of messed up go arounds?
- Does the FAA check the Go Around task on all FAA check-rides?
- How often are messed up Go Arounds the cause of a fatal GA accident?
- As is, are we in GA adequately prepared by FAA for excellent GO AROUNDS?

FLIGHT REVIEW / AQP / AFR

- Have you ever had a Flight Review?
- How often are they due?
- Can you do a Flight Review more often than is required?
- What is the FAA requirement of minimum items to be included on your FR/BFR?
- Have you ever heard of AQP?
- Have you ever been though an AQP briefing prior to an AQP AFR before?

FATAL ACCIDENT DATA

The 2018 NTSB fatal accident data showed a marked increase in fatal accidents for General Aviation. The rate increased 9.4% per 100,000 flight hours to a new benchmark of 1.029 fatal accidents per 100,000 flight hours. Almost a full 10% increase!

This new data will affect all fliers in the private sector due to the insurance industry response. Many insurance carriers have closed their doors, or are about to. Most new and expensive used aircraft purchases involve bank financing. Any time a lender is involved in an aircraft transaction full coverage for hull loss will be required. The ability for YOU to obtain or renew your existing coverages may be affected in the near future. A significant increase in annual premium is likely imminent even if you have had no losses or claims for many years. The derived data for 2019 is equally dismal.

What can we do? It is obvious that there will be no new revelation or effective change inspired by either government or large association. The only obvious direction that we as a community can go, is to recognize the marked deficiencies in the GA world as compared to airline industry, and copy their successful methods and techniques for drastically reducing the fatal GA accident rate.

On the following page, is a side by side comparison of accident rates GA versus the Airlines.

Year	All GA Accidents	Fatal GA Accidents	All GA Accidents Per100k Flight Hours	Fatal GA Accidents Per 100k Flight Hours	Total GA Fatalities	Part 121 Fatalities
2011	1469	266	6.121	1.202	448	0
2012	1473	273	7.039	1.302	440	0
2013	1224	221	6.258	1.118	390	0
2014	1223	255	6.229	1.299	424	0
2015	1210	230	5.851	1.098	378	0
2016	1267	213	5.934	0.984	386	0
2017	1233	203	5.672	0.935	331	0
2018	1275	225	5.876	1.029	381	1
2019*	1179	224	5.350	1.018	382	3
*2019 Results based on published NTSB data to date and calculated per previous year formulations. Total Fatalities					3560	4

FLIGHT CHOPS

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Our community, via voluntary Grass Roots efforts in awareness and self-guided improvement is the first step in reversing the trend.

The entire point of this new Flight Chops video is to introduce these concepts, and to highlight the major differences that are so lacking in the GA world. We do not have to sit on the sidelines and accept another senseless fatal GA accident every 1.7 days!

Finally, we want to illustrate how to practice, review, and improve! Together we can IMPROVE!

My efforts in this video series are not financially motivated. I do not get paid in any way, and often have to cover some of my own time and expenses in the Grass Roots project. My friend Steve, a.k.a Flight Chops, bears the tremendous cost of production, equipment and editing. If you are able to become a PATREON supporter of his channel, it is very inexpensive ($1.00 per video) and it provides much needed support for his travel to capture this important content. See Patreon link on his website at https://flightchops.com/patreon/

Please help us, help us!

The following documentation is detailed further insight for the areas of highest probability in General Aviation.

Thank you for your support of this project!

Sincerely,

Dan

Dan Gryder, Flight Instructor

FLIGHT CHOPS

PRACTICE REVIEW IMPROVE

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GENERAL AVIATION FATAL ACCIDENT POSSIBLE SCENARIOS

CONTROLS STILL WORKING AT IMPACT

CATEGORY	PROBLEM	SOLUTION
1. C-FIT	SD – D	F + P.R.I.
2. C-FIT	SD – N	F + P.R.I.
3. C-FIT	I-IMC ATO	P.R.I.
4. C-FIT	U-IMC ATO	F + P.R.I.
5. C-FIT	BUZZING/ACRO	AVOID
6. C-FIT	MIS HANDLED ABN.	P.R.I.
7. C-FIT	TERRAIN COLLISION	iPad
8. C-FIT	LOSS OF AHRS IN FLT	iPad
9. C-FIT	*intentionally left blank*	
10.C-FIT	*intentionally left blank*	

CONTROLS NOT WORKING AT IMPACT

CATEGORY	PROBLEM	SOLUTION
11. U-FIT	LOTOT	P.R.I.
12. U-FIT	LOSS OF SPEED AWARENESS	DMMS + P.R.I.
13. U-FIT	VMC ROLL OVER	P.R.I.
14. U-FIT	MIDAIR COLLISION	ADS-b + iPad
15. U-FIT	IN FLIGHT ICING	AVOID
16. U-FIT	MESSED UP G/A	P.R.I.
17. U-FIT	FAILED FLT CONTROL SYSTEM	PREFLT/MTC
18. U-FIT	RTO	P.R.I.
19. U-FIT	SEAT SLIDES BACK	PREFLT/MTC
20. U-FIT	*intentionally left blank*	

Since the end result of a fatal GA accident is always a wrecked plane and death(s), then obviously flight into the earth was the root cause of the blunt trauma! Blunt trauma is almost always the cause of death. No one ever got killed by the act of falling itself. It's that pesky sudden stop at the end that does it every time!

All of these flights can therefore broadly be placed in one of two buckets:

- Uncontrolled flight into terrain (the earth) which is U-FIT (commonly referred to as LOC-I by NTSB)
- Controlled flight into terrain (the earth) which is C-FIT
- In U-FIT, (LOC-I) the aircraft is not responsive to flight control inputs due to lack of airflow over them.
- In C-FIT, the aircraft is responsive to flight control inputs right up until impact.
- SD is special disorientation, day (D) or night (N)
- I-IMC ATO is intentional IMC after takeoff (i.e. a departing IFR flight)
- U-IMC ATO is unintentional IMC after takeoff (a surprised VFR pilot rotating up into IMC)
- Vmc Roll over is Min controllable airspeed LOC-I due to one engine inop on a twin. LOTOT - twin
- F is FOGGLES on a lanyard around your neck and at the ready for quick don.
- P.R.I. is Practice, Review, Improve.

Being aware of the problem and practicing and reviewing in advance will cause drastic improvement in the outcome.

1. C-FIT: SD-D CONTROLLED FLIGHT INTO TERRAIN - SPATIAL DISORIENTATION - DAY

This happens when an IFR rated or non IFR rated pilot gets disoriented during day flight. This is usually, but not necessarily in IMC conditions. The scenario is the result of either intentional or unintentional flight into these confusing conditions. Regardless of the intent or not, the common scenario is simply a deteriorating and ultimate loss of distinguishable outside horizon (earth) using visual cues. Most often this is associated with flying into clouds, but not necessarily. Flying near rain, over desolate land or over water could initiate the disorientation. The human mind is often set on "eyes outside" for reference data, as in what is level and what is not. The matter can often be complicated by ATC contact and ATC instruction that is a constant reminder to a pilot already disoriented to "Maintain VFR" This is almost a direct order from the FAA to keep looking outside the aircraft (includes airplane or helicopter) and maintain visual reference. Once this reference is gone, the resulting track of the aircraft is often a large swooping spiral known as a death spiral, or graveyard spiral of ever tightening radius as the pilot is flying by seat of the pants feeling and disregarding instruments. Most commonly, this ever-tightening circle is performed to the left. The aircraft typically hits the ground very steep and at a very high speed. In error, the NTSB often makes reference to this type of accident as a loss of airplane control or LOC-I inflight accident. Loss of control implies that the controls were not working properly at the time of impact. Most SD fatal crashes occur where the controls were in fact performing perfectly, and the aircraft was perfectly controllable even though the pilot positioned those controls improperly due to undue influences. Most SD fatal crashes are specifically "not" U-FIT or loss of control, but rather C-FIT.

SOLUTION: When conditions become marginal, and before the situation deteriorates too far, confess your actual situation to ATC and declare an emergency. Your PIC emergency authority becomes a status and you are granted an instant temporary IFR rating, and you are LEGAL to be in the clouds! If you have any kind of view limiting device, put it on and concentrate solely on keeping wings level and DO NOT look outside! Much like blinders on a horse or mule, a view limiting device is calming and eliminates scary stuff from your view. A view limiting device eliminates the sensation of rush of cloud and moisture streaming past your window from your view. It's like not looking down while on a tall ladder. Wearing a view limiting device in flight is NOT normally legal, but once you declare an emergency, use any and all tools available to you in order to survive the encounter. You did all of your primary training wearing a view limiting device and you did just fine in keeping the craft level at that time. This is no different. When ATC says to "maintain VFR" reply to them: "Negative, unable to maintain VFR, I am emergency aircraft, request all available assistance." When ATC gives you instructions, try to separate out turns and climbs. If a climb is required, accomplish that before a turn if able. Confess to ATC your actual situation and IFR skill level. If you are issued a turn, do it very slowly with full concentration on that panel. DO NOT attempt to look outside until you are very sure that you are back in VMC conditions.

If you are not in contact with ATC use all resources to point the aircraft towards where you came from, or towards better weather. **You have got to be very careful and do things very slowly during this time. Do not look away from that panel for more than a second. This procedure is critical to your survival.** Practice this with a safety pilot or your CFI until you are an expert at it. SD-D and SD-N is one of the highest repeat causes of fatal accidents in GA. Normally chances of survival are not very high for a pilot in these conditions regardless of the skill level of the pilot. SD happens best when you are not ready for it.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of airplane control due to spatial disorientation. The accident report may be accessed through the aviation synopses page on the NTSB website. The NTSB accident number is CEN17FA362

SAMPLE VIDEO: https://www.youtube.com/watch?v=b7t4IR-3mSo

2. C – FIT: SD-N CONTROLLED FLIGHT INTO TERRAIN - SPACIAL DISORIENTATION - NIGHT

This happens when an IFR rated or non IFR rated pilot gets disoriented during night flight. This is usually, but not necessarily in IMC conditions. The scenario is the result of either intentional or unintentional flight into these confusing conditions. Regardless of the intent or not, the common scenario is simply a deteriorating and ultimate loss of distinguishable outside horizon (earth) using visual cues. Most often this is associated with flying into clouds, but not necessarily. Flying near rain, over desolate land or over water could initiate the disorientation. The human mind is often set on eyes outside for reference data, as in what is level and what is not. The matter can often be complicated by ATC contact and ATC instruction that is a constant reminder to a pilot already disoriented to “Maintain VFR” This is almost a direct order from the FAA to keep looking outside the aircraft (includes airplane or helicopter) and maintain visual reference. Once this reference is gone, the resulting track of the aircraft is often a large swooping spiral known as a death spiral, or graveyard spiral of ever tightening radius as the pilot is flying by “seat of the pants” feeling and disregarding instruments. Most commonly, this ever-tightening circle is performed to the left. The aircraft typically hits the ground very steep and at a very high speed. In error, the NTSB often makes reference to this type of accident as a loss of airplane control or LOC-I inflight accident. Loss of control implies that the controls were not working properly at the time of impact. Most SD fatal crashes occur where the controls were in fact performing perfectly, and the aircraft was perfectly controllable even though the pilot positioned those controls improperly due to undue influences. Most SD fatal crashes are specifically not U-FIT or loss of control, but rather C-FIT.

SOLUTION: When conditions become marginal, and before the situation deteriorates too far, confess your actual situation to ATC and declare an emergency. Your PIC emergency authority becomes a status and you are granted an instant temporary IFR rating, and you are LEGAL to be in the clouds! If you have any kind of view limiting device, put it on and concentrate solely on keeping wings level and DO NOT look outside! Much like binders on a horse or mule, a view limiting device is calming and eliminates scary stuff from your view. A view limiting device eliminates the sensation of rush of cloud and moisture streaming past your window from your view. It's like not looking down while on a tall ladder. Wearing a view limiting device in flight is NOT normally legal, but once you declare an emergency, use any and all tools available to you in order to survive the encounter. You did all of your primary training wearing a view limiting device and you did just fine in keeping the craft level at that time. This is no different. When ATC says to "maintain VFR" reply to them: "Negative, unable to maintain VFR, I am emergency aircraft, request all available assistance." When ATC gives you instructions, try to separate out turns and climbs. If a climb is required, accomplish that before a turn if able. Confess to ATC your actual situation and IFR skill level. If you are issued a turn, do it very slowly with full concentration on that panel. DO NOT attempt to look outside until you are very sure that you are back in VMC conditions. If you are not in contact with ATC use all resources to point the aircraft towards where you came from, or towards better weather. You have got to be very careful and do things very slowly during this time. Do not look away from that panel for more than a second. This procedure is critical to your survival. Practice this with a safety pilot or your CFI until you are an expert at it. SD-D and SD-N is one of the highest repeat causes of fatal accidents in GA. Normally chances of survival are not very high for a pilot in these conditions regardless of the skill level of the pilot. SD happens best when you are not ready for it.

SAMPLE ACCIDENT REPORT: The pilot's failure to maintain control of the airplane during a descent over water at night, which was a result of spatial disorientation. Factors in the accident were haze and the dark night. The accident report may be accessed through the aviation synopses page on the NTSB website. The NTSB accident number is NYC99MA178.

SAMPLE VIDEO: https://www.youtube.com/watch?v=028tTU-sZFA

SAMPLE VIDEO: https://www.youtube.com/watch?v=F84ZyIYGIrY

3. C – FIT: I- IMC ATO CONTROLLED FLIGHT INTO TERRAIN

INTENTIONAL INSTRUMENT METEORLOGICAL CONDITIONS AFTER TAKE OFF

This happens when an instrument rated pilot files an IFR flight plan and receives a proper clearance and is fully trained and expecting IMC conditions after takeoff. For whatever reasons, the pilot in this case becomes distracted, overloaded, or disoriented immediately after liftoff. The wreckage is typically found just off the end of the departure runway, within a few miles of the departure airport. In error, the NTSB often makes reference to this accident type as a loss of airplane control as a LOC-I or Loss of Control inflight accident. Loss of control implies that the controls were not working properly at the time of impact. Most SD fatal crashes occur where the controls were in fact performing perfectly, and the aircraft was perfectly controllable even though the pilot positioned those controls improperly. In the first 1000 feet of climb, pay very close attention to aircraft control and consider the delay in accomplishing the following items until you are sure that you can manage an additional task:

Flaps up / Contact departure / Ident / Boost pump off / Landing light off / Check in with departure / Reduce power / Set new assigned altitude / set new assigned heading.

It is appropriate to add the words *Single Pilot IFR* to your callsign to alert ATC that you do not wish to be over loaded after takeoff. This is similar to using Student Pilot after your call sign when learning to fly. You can also ask for both runway heading and a higher initial altitude before takeoff. Sometimes ATC can make a quick call and approve either or both of these for you so that you are not dealing with both a level off and a turn immediately after takeoff. Last, you can use your voice and let ATC know that this is a very low IMC departure and you desire excellent handling. This is like asking for sterile cockpit from ATC. Ask them to leave you alone until you get your craft stabilized. Most all ATC are highly experienced and very eager to help if you will tell them exactly how to help you. Most of all, aviate before you navigate, navigate before you communicate. Once you communicate, you have opened up the floodgates for ATC workload and they are going to load you up with more tasks. Take your time. ATC has overloaded many pilots within the first mile after takeoff from a class D airport and it is totally not necessary to sacrifice aircraft control. The Cheyenne crash in Louisiana went from liftoff to impact point in less than two miles. During the takeoff phase, be able to find the gear handle via feel while keeping your eyes on the ADI. *Up Simba, Up Simba* or similar phrases are good self-reminders to say to yourself while you keep that nose up and climbing properly. Set the pitch first via ADI and then make slight pitch refinements using airspeed information. If you have an autopilot, consider bringing it on line as soon as speed, altitude, and limitations allow.

SOLUTION: Get with your CFI, or a favorite safety pilot and rehearse this scenario. Get good at prioritizing your workload. File an IFR flight plan from a controlled field so that you can practice picking up your clearance, using *Single Pilot IFR* in your call sign, and asking for sterile cockpit after takeoff. Try asking for higher initial altitude and runway heading and see if the controllers will make that call for you and work out an easier clearance. Sometimes they can, sometimes they cannot. Practice being super diligent on that ADI during takeoff and immediately after takeoff. DO NOT let anything distract you from your primary job. Practice. Review. Improve. This is an absolute killer category and ATC is a major contributing factor in many cases. This is your life. Slow down and ask for help. Do not rush to accomplish tasks ahead of aircraft control. Practice this routine every time you fly IFR.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of control due to spatial disorientation during takeoff in instrument meteorological conditions. Accident Number: CEN18FA061

SAMPLE VIDEO: https://youtu.be/5PZyhCWKvcI

4. C – FIT: U- IMC ATO CONTROLLED FLIGHT INTO TERRAIN

UNINTENTIONAL INSTRUMENT METEORLOGICAL CONDITIONS AFTER TAKE OFF

This happens when a non-instrument rated pilot attempts a takeoff and intends to stay visual, but is unable due to low clouds and poor visibility. This type accident is typical of a pilot not expecting IMC conditions after takeoff. The pilot in this case becomes distracted, overloaded, or disoriented immediately after liftoff. The wreckage is typically found just off the end of the departure runway. In error, the NTSB often makes reference to loss of airplane control as a LOC-I or Loss of Control inflight accident. Loss of control implies that the controls were not working properly at the time of impact. Most SD fatal crashes occur where the controls were in fact performing perfectly, and the aircraft was perfectly controllable even though the pilot positioned those controls improperly.

SOLUTION: Commit to doing a much better job on obtaining weather briefings for current and forecast conditions. If you rotate up into IMC and are surprised, you likely made your error before boarding the plane. Preflight planning and ADM are skills that must be practiced on every flight. Night departures are the most likely scenarios for being surprised by being IMC during a VFR departure. Practice this with a CFI or really good safety pilot where you rotate and have to transition immediately to panel. Do not attempt to stay visual and lower the nose unless you are sure that you can afford to do that. Often times the IMC conditions go all the way down to very close to the ground. If you come back out of the sky at 1200 FPM you will never be able to react in time.

Practice this maneuver by using a view limiting device, and consider flying with a view limiting device in case of emergency where you need to not be able to look outside at the reference that will be the cause of SD. Remember, SD is not caused by looking at your panel. It is caused by looking outside for a reference that is not there! Practice. Review. Improve.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The non-instrument-rated pilot's decision to depart into instrument meteorological conditions, and his subsequent loss of control due to spatial disorientation. NTSB Accident Number: CEN17FA361

SAMPLE VIDEO: https://www.youtube.com/watch?v=028tTU-sZFA

5. C -FIT: BUZZING / ACRO CONTROLLED FLIGHT INTO TERRAIN - BUZZING OR LOW-LEVEL ACROBATICS

This happens mostly during day VMC conditions where the goal is low passes, photo passes, airshow operations, persons watching, or aerobatic practice. Unseen obstacles such as guy wires, transmission lines, towers, often are the first point of contact. Attempting acrobatic flight for the first time, or attempting acrobatic maneuvers too close to the surface area, or disorientation during high G maneuvers often cause fatal impact with the terrain. Numerous fatal accidents have been caused by attempted loop maneuver that was started too low and cannot be completed before impact.

SOLUTION: Try to avoid impromptu buzzing or unplanned low passes. Experimental acro is rarely a good idea and it is best to start high with an experienced acro CFI. Use of Foreflight is highly recommended for obstacle avoidance during low level flight, but overall low-level flight is highly dangerous and the best solution is to not participate in this type of flying.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's decision to fly along the river at a low altitude contrary to applicable regulations and safety of flight considerations which resulted in the impact with the power lines. Contributing to the accident was the pilot's inability to see the and avoid the power lines due to their proximity to a bend in the river and the position of the sun at the time of the accident. NTSB Accident Number CEN18FA011

SAMPLE VIDEO: https://www.youtube.com/watch?v=4ElP2v1_pbQ

6. C-FIT: MIS HANDLED ABN/EMER

CONTROLLED FLIGHT INTO TERRAIN - MIS HANDLED ABNORMAL /EMERGENCY

An abnormal is any event in flight that is not considered normal, and that could cause a pilot to be distracted by it, or if not properly corrected, that could cause an accident. Mis-prioritizing and giving the abnormal more attention than aircraft control is often the result. If you are flying with two people up front, consider immediately declaring who going to fly and who is going to deal with the problem. Sample problems include such things as GPS waypoint modification, attending to a system that is not normal, attending to a passenger that is needing attention, etc. Use a briefing such as; "You fly the plane, I am going to work on resetting the waypoints on this flight plan. You have ATC, you have the aircraft, etc." An inflight emergency is of more serious nature and can still cause the distraction as mentioned above concerning abnormal. Depending on the severity of the abnormal, the situation may require that you turn the aircraft immediately towards an airport or suitable terrain. Declare an emergency if in contact with ATC. ATC will often ask if you want to declare an emergency. They cannot formally do this for you and this is their way of prompting you to do that. If landing at an airport with emergency services, *ask for all men and equipment.* This is a phrase that will alert the controller that you desire emergency services be scrambled to the field immediately. It sometimes takes 4 to 5 minutes to get emergency fire and rescue equipment loaded and enroute to the waiting area on the field. Start this immediately. There are three types of emergencies which will dictate the type of urgency that you should use.

1.) LAND as soon as practicable: You may want to continue on and land as soon as it is convenient for you, because your emergency is not time critical.

2.) LAND as soon as possible: Find the nearest airport with a runway and turn immediately that direction. Plan to land regardless of how inconvenient that location may be. The reasons for "land as soon as possible" include at minimum - any problem with fuel supply, airflow to the engine, combustion/ignition, smoke in the cabin, unresponsive flight controls, or unknown vibration.

3.) LAND immediately. You will be landing on something directly in front of you, or very near. It will likely not be an airport. *The reasons for land immediately include, at a minimum; engine fire, cabin fire, fuselage fire, or uncontrolled smoke in the cockpit.*

SOLUTION: Consider incorporating this in your next AQP AFR preflight briefing and discussion with your CFI. Talk about what emergencies are likely scenarios for your aircraft and your typical flying mission. Consider a flight where your CFI manufactures a sample simulated abnormal or emergency during your flight and debrief how you did. Did you turn towards an airport? Did you lose heading or altitude during the process of dealing with the abnormal? There are numerous safe options for surprise abnormals that can add real time effect.

Practice. Review. Improve. Be aware of how distractions can cause loss of aircraft control. Generally, pilots are afraid to declare an emergency in flight and ask for equipment. This authority granted to you is always available, but you have to ask for it!

SAMPLE REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of directional control and his failure to abort the takeoff, which resulted in a runway excursion and collision with terrain. NTSB Accident Number CEN18FA193

SAMPLE VIDEO: https://www.youtube.com/watch?v=weNLHLWSg6g

7. C-FIT: TERRAIN COLLISION CONTROLLED FLIGHT INTO TERRAIN-TERRAIN COLLISION

This happens mostly in flight where the pilot does NOT become disoriented. The pilot is simply unaware of the looming terrain in his or her flight path. Normally the aircraft is proceeding normally and there is no cause for alarm, other than the fact that the aircraft path is directly aimed at an object. These accidents can occur when in either visual or in IMC conditions.

SOLUTION: In today's advanced GPS world, there is no reason to ever be the victim of terrain collision due to not knowing that there was terrain ahead. Numerous companies such as ForeFlight make products for the iPad and phones that clearly show terrain in both two dimension and three dimensions. Numerous companies make highly accurate synthetic vision for the portable devices making surprise encounters totally rare and becoming obsolete. The total cost of such a system is very affordable and other products such as flight planning, fuel planning, and weather information make the technology invaluable to fly with. Try to get with your local CFI or best safety pilot and simulate navigating around towers or terrain using the electronics for reference as if it was either night or reduced visibility conditions.

SAMPLE ACCIDENT REPORT: #1 The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's decision to fly into a canyon during wind conditions conducive to turbulence and downdrafts, and his subsequent loss of aircraft control while maneuvering in the canyon. Contributing to the accident was the pilot's limited canyon flying experience. NTSB Accident Number: WPR17FA213

SAMPLE ACCIDENT REPORT: #2 The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain clearance from terrain after takeoff during dark night conditions. NTSB Accident Number: CEN17FA227

SAMPLE VIDEO: https://www.youtube.com/watch?v=BXr3xr4rj98

8. C-FIT: LOSS OF AHRS IN FLT

CONTROLLED FLIGHT INTO TERRAIN-LOSS OF ATTITUDE HEADING REFERANCE SYSTEM

This accident is where loss of vacuum (older planes) or loss of attitude display (newer planes) causes the pilot to have very little pitch and bank information, or in some cases none at all. The old school name for this was called *partial panel flying* and IFR rated pilots received training and check ride evaluation on their ability to fly while under IMC (real or simulated) conditions with loss of Attitude, Heading reference System (AHRS) In later model more advanced aircraft there is an actual unit called the AHRS hardware that generates gyroscopic information that is then sent to the display. In electronic aircraft, either the AHRS unit or the display itself could fail while in IMC conditions, and require the pilot to be able to fly and navigate on remaining data.

SOLUTION: In today's electronic world, numerous affordable options are available that will give both navigation and basic ADI information to the pilot. The non AHRS portable devices use GPS data to generate cockpit instrumentation that show basic primary flight instruments. The AHRS based portable electronic instruments use an actual portable AHRS unit to generate this information and send it to the portable device. You may have seen these devices sitting on the glare shield of some airplanes in the last few years. Get with your CFI or best safety pilot and practice flight under a view limiting device by sole reference to a portable device for all information. This takes some time to get used to, so practice this often. Then review. You will improve.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to control the airplane while maneuvering because of spatial disorientation. Contributing to the accident were the failure of the airplane's primary attitude indicator and the adverse weather conditions, including turbulence. Accident Number: CHI01MA011

SAMPLE VIDEO: #1 https://www.youtube.com/watch?v=oYtTIPUbnTI

11. U-FIT: LOTOT UNCONTROLLED FLIGHT INTO TERRAIN - LOSS OF THRUST ON TAKEOFF

The NTSB refers to these accidents as LOC-I or loss of control, Inflight. One of the highest category fatal accidents for all of General Aviation is LOTOT. In this scenario the primary power plant fails during takeoff when the aircraft is lowest to the ground, and the pilot is least prepared for it. The airplane may be climbing slightly steeper at Vx for obstacle purposes or closer to Vy as normal. The sudden shock of the sudden loss of thrust has been proven to cause pilots to unconsciously pull aft on the yoke or stick during the brief time of confusion. The aircraft typically has between 2 and 8 seconds before the wings stall and the aircraft departs controlled flight. Traditional FAA stall recovery is always practiced up high, and is always recovered through use of both pitch and power. In this real-life scenario, the pilot is expected to make a stall recovery without the use of any power, a maneuver that has never been taught or checked by FAA at any time for single engine planes. The aircraft typically turns left and pitches as much as 80 degrees nose down and impacts nearly vertical. The LOTOT accident scenes are often obvious due to witness reports of engine failure sounds, the resulting near vertical flight profile, and the entire resting wreckage being located just to the left side of the runway (not always) and inside of a very tight circle. More than 80% of these crashes involve an impact explosion or a post impact fire that makes survival completely impossible.

SOLUTION: This one is important! Get with your best CFI and practice this up high. Go through dozens of repetitions where you lower the nose based on when you hear the engine pitch change. This is called conditioning. You are conditioning your own reflexes! Learn to associate an immediate body reaction that correlates to the sound and feel of an engine losing RPM. Prior to every takeoff, brief the departure in terms of an RTO as well as LOTOT. Be *expecting* the engine to quit soon after takeoff and be ready to PUSH to obtain a best glide deck angle. If your ASI is placarded with a DMMS speed, try to adjust pitch for DMMS at a minimum after the failure. You can also practice simulated ones closer to ground if you are sure of suitable landing areas if anything goes wrong. It is often very helpful to try these with throttle only around 400 feet AGL after takeoff, but this practice is solely at the discretion of the instructor. In real life, you have only a few seconds to push during an engine failure immediately after takeoff. Practice. Review. Improve. Your life depends on this.

SAMPLE ACCIDENT REPORT: #1 The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadequate fuel planning, which resulted in a total loss of engine power due to fuel starvation during the initial climb, and his failure to maintain adequate airspeed while turning back to the runway, which resulted in an exceedance of the airplane's critical angle of attack and an aerodynamic stall. Accident Number: ERA18FA152

SAMPLE ACCIDENT REPORT: #2 The National Transportation Safety Board determines the probable cause(s) of this accident to be: An in-flight fire and total loss of engine power after takeoff due to a loose fuel line. Contributing to the accident was the installation of an unapproved fuel line by unknown personnel.

Accident Number: ERA18FA138

SAMPLE ACCIDENT REPORT: #3 The National Transportation Safety Board determines the probable cause(s) of this accident to be: A total loss of engine power due to fuel starvation for reasons that could not be determined based on the available evidence. Also causal was the pilot's decision to return to the runway following the loss of engine power, and his failure to maintain airspeed during the turn, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall/spin. NTSB Accident Number: WPR17FA152

SAMPLE VIDEO: https://www.youtube.com/watch?v=O-eBrxma1X0

SAMPLE VIDEO: https://www.youtube.com/watch?v=In6gWMq35sk

SAMPLE VIDEO: https://www.youtube.com/watch?v=wVXV6RCHbwA

12. U-FIT: LOSS OF SPEED AWARENESS UNCONTROLLED FLIGHT INTO TERRAIN - LOSS OF SPEED AWARENESS

The FAA desires that all aircraft maintain a minimum 30% speed buffer above stall in all flight conditions. The exception to this is during final approach when under certain condition it may be permissible to go as low as 20% above stall speed, or 1.2 Vso. A large percentage of GA accidents occur during clean wing maneuvering either after takeoff during climb, or entering the traffic pattern and maneuvering. When a pilot becomes distracted and allows speed to decay, GA has no audible or visual warning to alert the pilot that they have transgressed this sacred 30% area. The stall horn does activate very close to the actual stall but in most cases, it is too late. A spin often follows an aerodynamic stall. Most of these accidents happen below 1000 AGL where even the most proficient pilot in the world would have no chance of completing a spin recovery prior to impact. PREVENTION is the only real tool available. Be aware of that 30% by placarding Vs1 x 1.404 for your aircraft right on the face of your airspeed indicator! Studies have shown that this simple indicator is almost 100% effective in increasing a pilot's awareness of where this 30% clean buffer boundary is.

SOLUTION: Placard your ASI with a DMMS marker and practice referring to it often while in the pattern. Take immediate corrective action any time you are in flight below DMMS speed and not on final approach. DMMS awareness leads to the PREVENTION of low speed condition fatal accidents. Practice. Review. Improve.

SAMPLE ACCIDENT REPORT: #1 The National Transportation Safety Board determines the probable cause(s) of this accident to be: The sport pilot's failure to maintain adequate airspeed during landing in crosswind conditions resulting in an aerodynamic stall. Accident Number: ERA10LA158

SAMPLE ACCIDENT REPORT: #2 The National Transportation Safety Board determines the probable cause(s) of this accident to be: An engine malfunction for undetermined reasons and the subsequent loss of control, due to the pilot's improper decision to maneuver the airplane below minimum controllable airspeed and his improper response to the loss of engine power. Accident Number: CEN18FA116

SAMPLE ACCIDENT REPORT: #3 The pilot's failure to maintain airspeed during a steep turn after takeoff, resulting in an exceedance of the airplane's critical angle of attack and a subsequent accelerated stall at an altitude too low for recovery. NTSB Accident Number CEN18FA147

SAMPLE VIDEO: https://www.youtube.com/watch?v=M8scVzLX9l8

13. U-FIT: Vmc ROLL OVER

UNCONTROLLED FLIGHT INTO TERRAIN - VELOCITY MINIMUM CONTROLLABLE ROLL OVER

This accident is confined to multi engine aircraft only where the sudden loss of thrust during takeoff causes a large thrust differential between the two powerplants. The continued thrust from one side as compared to the drag associated with the failed opposite engine causes a turning moment that is normally quite pronounced. The net effect is that the aircraft performs what appears to be a low-level acrobatic maneuver and typically impacts the earth almost inverted and about thirty degrees off of runway heading. Numerous recent crashes in both Hawaii and Texas have spotlighted the deadly rollover effect where the crash site was located in a very small area (near vertical impact) just off the runway. Vmc training is often inadequate, not recent, or not taught correctly in preventing the fatal outcome. The most pronounced effect of the sudden loss of power occurs immediately after takeoff and during high angle of attack. On some aircraft, the two-engine climb angle can be as high as 18 degrees. Most training facilities train pilots for what they consider to be *worst case scenario* or loss of power during the act of rotation. In that case the pilot is easily able to control the craft by raising the nose up to a target pitch specific to that aircraft and those conditions. Often times this is the only maneuver that training is provided for. In real life, the actual engine failure occurs at around 300 feet while climbing and the pitch has already been established at a very high (normal) angle. A pilot that is trained to raise the nose *up to* target pitch in time of crisis will often pull aft on the yoke during the engine failure when the correct action is actually to *push down* to the same target pitch. A single engine pitch should be established that maintains Vyse by adjusting pitch and completing the memory items.

Quickly establishing proper pitch appropriate to the loss of thrust offers enough airflow over the vertical stab and rudder to make the aircraft controllable. Flight below Vmc (red arc) will normally cause the Vmc roll over effect. Being ready to immediately establish proper pitch and even the acceptance of the loss of some altitude are all possible during this precarious maneuver. If it becomes obvious that the rollover is beginning, the pilot should consider closing the opposite throttle in order to equalize the thrust differential immediately.

SOLUTION: If you fly multi engine aircraft, this is one that you have got to train for and be ready for. Constant preparation and pre takeoff rehearsal are critical for quick action during the loss of thrust on takeoff in any multi engine plane. Get with a MEI or consider simulator training that can review these fundamentals often. Practice. Review. Improve.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of both the pilot and the certified flight instructor to ensure that the left fuel selector was in the on position for takeoff and their failure to follow the proper procedures when the left engine lost power shortly after takeoff, resulting in an in-flight loss of control. Accident Number: ERA11FA054

SAMPLE VIDEO: https://www.youtube.com/watch?v=UYtH84TvYuk

14. U-FIT: MIDAIR COLLISION UNCONTROLLED FLIGHT INTO TERRAIN - MIDAIR COLLISION

This accident most often occurs in the VFR traffic pattern at uncontrolled airports although it could happen anywhere. The impact of two aircraft in flight most often renders both unable to be controllable and results in double fatal accidents.

SOLUTION: The technology now afforded by both GPS and ADS-b make awareness of other aircraft much easier. Using excellent scan technique and close listening on the proper CTAF frequencies should be standard. Practice collision avoidance with your CFI on board by referencing electronic information, but take special care to be very proactive on the radio to both announce your position accurately, and state your intentions, and be an excellent listener. Ask for clarification from other aircraft operating at your same airport if you are unsure of their position or intentions. Make standard and predictable paths while in the vicinity of airports, and ask for a detailed debrief from your CFI on your midair collision avoidance skills. Practice. Review. Improve.

SAMPLE ACCIDENT REPORT: #1 The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of both pilots to see and avoid each other while in level cruise flight, which resulted in a midair collision. NTSB Accident Number: ANC16FA061B

SAMPLE ACCIDENT REPORT: #2 The National Transportation Safety Board determines the probable cause(s) of this accident to be: Both pilots' failure to maintain adequate clearance from each other during cruise flight while in visual contact with each other. Contributing to the accident was the unexpected abrupt maneuver made by the pilot. NTSB Accident Number: WPR14FA174A

SAMPLE VIDEO: https://www.youtube.com/watch?v=iM3oNcQx_uU

15. U-FIT: IN FLIGHT ICING UNCONTROLLED FLIGHT INTO TERRAIN - INFLIGHT ICING

Many fatal in-flight icing occurrences happen every year with needless loss of life and property. Most often the information was readily available concerning the freezing levels, or the pilot never checked this important part of the trip planning. On occasion, in flight icing is far more severe than was forecast and only recent PIREPS relayed in a timely manner could help prevent a tragedy. Preflight planning and ADM is so important for aircraft with little or no de-ice or anti-ice capability. Inadvertent flight into severe known icing is almost always fatal and not survivable. If you do encounter airframe ice, make your decision to climb or descend early, including declaring an emergency and making an immediate descent without ATC clearance if necessary. Often times the ice can accumulate very quickly so time becomes critical

SOLUTION: Better weather briefing efforts and better training concerning obtaining weather information for both before takeoff, and enroute becomes important. Get with your CFI and plan a sample flight, and go fly where you are asked to obtain updated weather in flight from FSS or electronic data. Become proficient at obtaining better briefings and becoming better at making ADM type decisions for on the ground, and in flight. Always ask for a debrief on how you did, and any tricks that you could use to do better. Practice. Review. Improve.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The airplane's encounter with severe icing conditions, which resulted in structural icing, and the pilot's increased workload and subsequent disorientation while maneuvering in instrument flight rules (IFR) conditions with malfunctioning flight instruments, which led to the subsequent loss of airplane control. Contributing to the accident was the pilot's decision to takeoff in IFR conditions and fly a single-pilot operation without a functioning autopilot and with malfunctioning flight instruments. Accident Number: CEN14FA009

SAMPLE VIDEO: https://www.youtube.com/watch?v=jHm4itwxpVY

16. U-FIT: MESSED UP G/A UNCONTROLLED FLIGHT INTO TERRAIN - MESSED UP GO AROUND

One of the most trusted and sacred maneuvers of any pilot is the Go Around. They say you can always go around, and usually that is true. But can you always Go Around and live to tell about it? Many GA fatal accidents occur as a result of a messed up go around. It's one where the pilot actually stalls the plane during the process or leaves runway environment during the process of trying to Go Around. During the process of adding full power, the nose on most any plane will naturally want to rise. The retraction of flaps while the nose goes too high is often the recipe for disaster. Being fully trained and ready for the Go Around is paramount.

SOLUTION: This is one of the most important maneuvers to practice with your CFI. You should chair fly through your actions prior to even going to the plane. Think about when to push power in, how much to lower the nose. Are you going to re trim? When do flaps start to be retracted? When do you talk on the radio and when do you flip all the switches for the after-takeoff checklist? Your CFI can help you rehearse this maneuver so that you are completely ready, and you do everything in the proper order. All planes are different concerning specifics, the point is that YOU are ready for the act of being required to Go Around by surprise at any time, without losing control of YOUR plane. Practice. Review. Improve.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's delayed decision to conduct a go around following an un-stabilized landing approach and his subsequent failure to maintain clearance from trees near the end of the runway. NTSB Accident Number: ERA16FA169

SAMPLE VIDEO: https://www.youtube.com/watch?v=yaaZEK22YRg

SAMPLE VIDEO: https://www.youtube.com/watch?v=b_CSX4H2Dh0

17. U-FIT: FAILED FLT CONTROL SYSTEM

UNCONTROLLED FLIGHT INTO TERRAIN - FAILED FLIGHT CONTROL SYSTEM

This type accident is now very rare, but it is possible to have a mis-rigged, unresponsive, or even a jammed flight control. Often the aircraft is still controllable to some extent in this condition but it warrants declaring an emergency and asking for all available assistance. Your return may be without incident, and it may not be.

SOLUTION: The best measures against this unfortunate scenario in flight are to take good care to prevent it on the ground. Proper and frequent airframe inspections of all control systems are required at each annual for GA planes, and more often than that in other cases. Make sure that your maintenance shop has your instructions to complete thorough inspections. Also make proper pre flights before each flight for any conditions that might be detectable just by observing and moving controls on the ground. Objects that fall off the plane, doors that come open, panels that are not secure can all lead to dramatic in-flight problems. Be very observant and prevent flight problems before you fly.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: Maintenance personnel's improper lubrication of the right direct aileron control cable and failure to detect the severe corrosion of the cable during a maintenance inspection, which resulted in the in-flight failure of the cable, the pilot's subsequent inability to maintain aircraft control, and the airplane's impact with terrain. NTSB Accident Number: ERA12FA484

SAMPLE VIDEO: https://www.youtube.com/watch?v=hTy4iwTszVw

SAMPLE VIDEO: https://www.youtube.com/watch?v=AsPA3u7JSFQ

18. U-FIT: RTO UNCONTROLLED FLIGHT INTO TERRAIN - REJECTED TAKEOFF

The airlines make exceptional effort to both brief and be ready for the RTO. They even include it as a maneuver on all recurrent check rides under AQP. General Aviation for single engine planes does not have such a maneuver, nor does it have any mention of in training material. The main emphasis is to know the abort points during any takeoff such as insufficient speed at a certain marker, or stagnating airspeed, or unknown vibration, etc. The pilot should be thinking about the runway length and how aggressively braking is going to occur if an RTO is required.

SOLUTION: Get with your CFI and discuss both the criteria for rejecting a takeoff (what we will and will not abort for) and the reference points that you want to use. Some common techniques are to use runway distance remaining markers, key points on the runway, or an elapsed amount of time from throttle advance to liftoff. As an example, you could use a timer and know that in your plane, you should be at 70 knots and rotating at the 20 second mark. If not, effect an immediate abort. Talk over your after-abort items with your CFI as well. Items such as calling the tower to advise of abort, whether you should taxi clear or not after abort, are the brakes hot, did you leave any debris on the runway, etc. All are good things to brief and try out with a CFI. As a test, have your CFI advance power for you but not give you full RPM. See if your abort parameters become obvious when you have passed a point or a certain amount of time and the plane still has not reached rotation speed. The point here is to think about this and discuss now when you have the opportunity to be ready for this. If you are surprised in an RTO, it might not work out well for you. Practice. Review. Improve.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper decision to depart into adverse weather conditions. Contributing was the gusty wind conditions. Accident Number: NYC07LA027

SAMPLE VIDEO: https://www.youtube.com/watch?v=IljFUURYhaw

19. U-FIT: SEAT SLIDES BACK UNCONTROLLED FLIGHT INTO TERRAIN - SEAT SLIDES BACK

Pilot seats are constructed such that they have a tremendous variance in position. Normally full aft for getting in and out of the plane, and mostly forward for operation of the plane. This is so that the pilot can reach the pedals on the floor and be close to panel controls for operations. The total distance of travel on some planes is as much as 18 inches. In this unfortunate scenario, a pilot seat can unlock and slide aft during the acceleration of takeoff. This causes the pilot to pull aft briskly on the control yoke or stick. From outside the plane, the aircraft appears to leap skyward in a very sharp climb until it stalls and returns to earth in an unsurvivable crash.

SOLUTION: Very careful and frequent inspection or seat tracks by both maintenance personnel as well as each PIC in each aircraft during each and every preflight. Be aware of seat tracks with elongated holes where the locking pin could become dislodged during takeoff. Compare other seat tracks as often as you can so that you can get an idea what good seat tracks look like compared to one with opportunity for a seat slide. Be very proactive on seat track awareness and mechanism operation. Assure that the pilot seat is properly and firmly locked in place prior to every takeoff, and cannot slide aft.

SAMPLE ACCIDENT REPORT: The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight instructor's failure to ensure that her seat was properly secured before initiating the takeoff, which resulted in a subsequent loss of control. Contributing was the lack of an installed secondary seat stop. NTSB Accident Number: ERA16FA141

SAMPLE VIDEO: https://www.youtube.com/watch?v=gDTERUjqusA

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