

Chapter 3

“POINT THE NOSE, LEVEL THE WINGS, and GET SOME SMASH!”

Sometime during the first day I explained to the class we had the simulator set up on Saturday for about an hour with each crew. The rationale and task was to discuss the issues of losing an engine on takeoff (called a V_1 cut) on day one, and get hands on time flying the jet during ground school. Then we could discuss it in more detail on the other class days and really be ready for the first simulator – with me.

That hour on Saturday would start with a blindfold cockpit check, have the student instructor pilot demonstrate a V_1 cut by bringing an engine to idle at “GO” and then explain each step climbing out to reverse course and make a single-engine approach. “But sir, we don’t practice this maneuver in the jet – I don’t think I have ever heard of anyone doing this even in the sim for recurrent training, and besides that it is not in the syllabus!” (Notice how I handle this - because he is absolutely right.)

“Lieutenant, yes you are correct. If you choose to not accept this type of training we can change the class right now;¹ however, having done this for a while let me suggest you at least try it out. Give it a chance. You might learn something. My reference for this is going back to the reading of John Boyd. You can go this way...or you can go that way. ‘To *be* or to *do*? Which way will you go?’”

I can count on one hand the number of students who even grumbled about this challenge. But having someone complain or someone holding issues like the syllabus over the adventure of learning how to fly on one engine is part of the leading, motivating, teaching, guiding, and helping someone with some reservations. There have been times where this was handled on the spot on day one and we headed off down to the sim two by two to get a lesson rather than talk about it – meaning sometimes the sim was available before Saturday.

Let’s visit a while on some of the system and operational issues of losing an engine on takeoff.

1. At GO (plus one knot) the engine fails. How can you tell? What are all the things that are going to happen?
2. What is the procedure to handle this?
3. Has anyone every had one fail on takeoff?

MOTIVATION

Let me tell you a story. Let me tell you how important it is to pay attention on takeoff with a student or a FNG in the other seat (flying new guy). Let me tell you how important it is to have a simulator to see, feel, experience something like an engine blowing up or smoke and fumes getting in the way of you seeing your instruments. Sometimes it happens pretty quick².

¹ On Sundays, first thing, was to hand out a ‘formative evaluation’ to see how the class was going. This was the time I usually checked on questions like non-syllabus compliance – did in fact change one class to accommodate.

² Let me point out to the civilian audience my lieutenants are Air Force pilots, they have wings, have been through the Air Force flying school and all have had training in flying on one engine – some even have flown larger airplanes than the trainers in Undergraduate Pilot Training (UPT) – so, this is not new; however, the C-21 has tip tanks and a different fuel system both of which have caused some issues. We will spend a lot of time creatively learning about jettisoning fuel and ‘cross flowing’ (not cross feeding) fuel in G. Heart Country.

I was checking out in a Boeing 747 in another life time and this big ole orange colored aeroplane was really nice to fly. I had once before checked out as engineer on it and now I was moving up to copilot. My instructor (we were classmates at OSU) was training me and said I was to make a normal take off on this first period. Knowing him pretty well with Braniff I said "Aw, hell Paul - give me a V_1 cut and see how well I can handle it." So, down the runway we went and bang it went. I too went bang. It happened so fast I have no recollection of dying on my first takeoff. Had a good attitude I thought and was pretty confident I could handle it but it ate my lunch. I didn't have the picture. Paul reset the sim and said "Runway heading to 2,000 feet and expect vectors to Jiffy for an ILS approach."

What should I have seen? First of all the yaw. The nose will start deviating from the center line. It will yaw toward the dead engine. "*Idle foot, idle engine.*" The pilot flying must use his rudder to keep it going straight down the center line. That means almost full rudder – so stick it all in! Aileron to level the wings, rudder to keep it straight. Note the aircraft, in this case, is still on the runway accelerating to a "Rotate" speed. We will, of course, have the engine fail, blow up, or catch fire, past this "GO, plus one" speed but this V_1 cut is the start and where the training (and checking) has the engine fail on takeoff.

History

The simulator has at least two ways of failing the engine – or at least two ways to fail an engine on takeoff both in training and in checking for the type rating ride. The engine button to push from the instructor's panel is either the ENGINE FAIL, or the ENGINE STOP button. In the first event the engine just rolls back from a takeoff setting which takes two or three seconds, and in the second event the engine freezes and goes from takeoff to zero thrust in less than one second.

The reaction time for keeping the nose straight depends on how the engine fails. The nose will slowly begin to depart the takeoff heading when the engine fails but it will immediately depart the centerline heading if it stops or freezes up. Note I said 'slowly' just as a comparison. We all know the pilot flying must be paying attention when this happens or he'll be knocking down runway markers and blowing dust and dirt as he leaves the concrete.

During every takeoff in my sim I demanded a V_1 cut. The IP candidate will bring one to idle at "GO" and practice, practice, practice the loss of an engine until it becomes second nature. "*If you stay 16 miles ahead of the jet...you will live!*" As they do not practice this except in my simulators this takes some serious thinking. The training is to let them get used to what the engine will do – and how fast it will do it – and then put the controls in to keep the jet down the center line until time to rotate and fly away. This procedure builds confidence and teaches being in control of the jet at all times – especially when some student is going to try and kill you...(you know I am connecting some dots).

Application

It does not take long for the student IP to see how important it is to stay ahead of the jet. It does not take long to see it takes skill to demonstrate the V_1 cut AND talk or instruct while bringing an engine to idle on takeoff. Again, the confidence will just soar after accomplishing this demonstration. We could write a book on just V_1 cuts. I cannot over emphasize gaining proficiency in V_1 cuts. The learning is golden!

The IP student demonstrating V_1 cuts will talk and do these steps (back to “You only have three seconds!”: At GO, I will bring an engine to idle simulating an engine failure. (Notice **the highlighted additional notes** – our learning is increasing with more experience.)

1. **Maintain Directional Control** - rudder and aileron as required
2. **Accelerate to VR.**
3. **Rotate at VR.**
4. **Climb at V2 – AT V2! (Minus zero plus two - max!)**

[POINT THE NOSE, LEVEL THE WINGS, and GET SOME SMASH!]

5. **Gear Up** – at positive rate of climb
6. Thrust Reversers – Off
7. Yaw dampener – Engaged

(When the aircraft is stabilized)

8. FUEL JTSN Switch – ON**

“Give me full rudder trim into the good engine.”

9. **When Clear of Obstructions, Accelerate to V2 Plus 30 KIAS and Retract Flaps - Use 1500 feet (AGL)**

10. **“TELL” ATC what you are going to do or what you need...don’t call them climbing out - FLY THE JET!**

THEN, when safe and away, ask the question: “What happened?” THEN call for the appropriate checklist. (One pilot is flying and one is MONITORING the flying. Climbing out is not the time to be heads down calling or doing a f’ing checklist.)

Discussion

This is still Day One. We are kind of reprogramming or resetting our goals and strategies to become instructors. Not yet talked about it but the operative word is “Airmanship.”

Questions now and for later:

1. What about getting back to the field? What arrival, approach, and when will the other engine fail?
2. The follow on training, after some proficiency in flying the jet through V_1 cuts, is to play **“Ok, lieutenant, I’m gonna kill you!”** (OKLIGKY). Ah, you are going to like this. I promise you this is worth the whole program to experience this lesson. I promise you again this has saved some lives – in Chapter 11.
3. What about some lives that didn’t get saved? Don’t want to get too deep into mishaps but we do have a history worth discussing as every instructor should know about ALL the accidents in his current airplane and the primary cause of each one of them.
4. Given some of this is spread out over the course I want to make sure to get started on this early in the program as it may save your life. Let me go back and read Lindbergh’s quote I mentioned earlier only use all of his own words about instructing.

*"I soon discovered that I was learning as much about flying as my students. A pilot doesn't understand the real limitations of his craft until he's instructed in it. Try as he may, he can never duplicate intentionally the plights that a student gets him into by accident. When you're flying yourself, you know in advance whether you're going to pull the stick back, push it forward, or cut the throttle. You think of a maneuver before you attempt it. But you're never sure what a student is going to do. He's likely to haul the nose up and cut the gun at the very moment when more speed is needed. If you check his errors too quickly, he loses confidence in his ability to fly. If you let them go too long, he'll crash you. **You must learn the exact limits of your plane, and always keep him far enough within them so the wrong movement of a control will still leave you with the situation well in hand...** And after you've learned how to keep a student out of trouble, you find that you've become a better pilot yourself. As you instruct your student in the primary art of flying he instructs you in its advanced phases" (The Spirit of St. Louis, pp. 278-279). (**My italics and highlight.**)*

A good instructor will handle the reality of crashing airplanes in such a way to make it noteworthy, to

There is a picture of a tombstone (no, I won't show it) showing the 'names' of the two crew members and the date of the crash. The name of the instructor is on top of the marker and the student is listed on the bottom – and then aircraft and state.

make it instructional, to make it where his student know there are some things he will really have to pay attention to AND where the new instructor pilot knows he had better pay attention and take notes.

This would be a good time in class to cover the mishaps of the airplane and in most classes time was given so all could see and understand the primary cause, failures, and where to go to read up on each one. The Air Force has a history of engine out (mostly practicing engine out) and management of fuel. Of course, there is a lot of blame on each one as who was at fault. *The task in the class was to not jump up and down on the bones of someone(s) that died in a crash but discuss the errors made so they won't happen again.*

This particular crash in our post event discussions and education tended to be about how to manage the fuel, especially when driving around with one at idle and letting the gas/fuel get out of balance. There are limits on how much the aircraft can get out of balance without really becoming a control problem so we spend time talking about 'how to check' and 'how to move' gas to stay safe.

For months most of us thought the fuel unbalance was the smoking gun in this crash. The Air Force sent the team to fly the simulator – like they always do when one falls/fails – and during this time a graduate of G. Heart Country was heading the mishap board and came into the class to discuss the matter. He was the only one to go through G. Heart Country that I knew of with a PhD and he showed his wisdom that day to the class.

He put wrote these three letters on the white board:

A
N
C

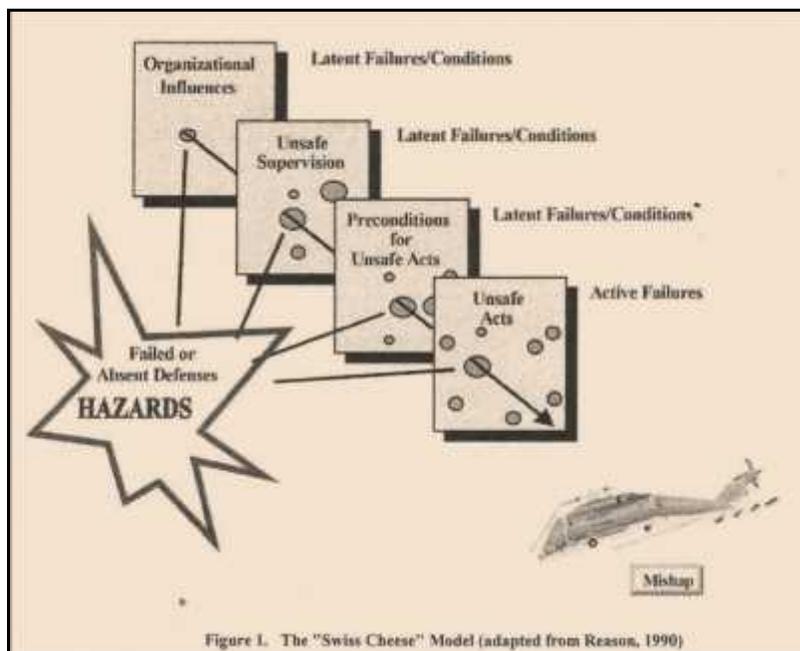
Course, it didn't take long for the class to say Aviate, Navigate, and Communicate. Then he added a fourth and asked what this meant:

I

The class, picking up on the tutorial lesson, said I is for INSTRUCTION. Then with the flurry of andragogical inspiration he moved the I to the top of the list remarking the instructor during the flight had replaced his aviating with instructing – and said they paid for it.

INSTRUCT
AVIATE
NAVIGATE
COMMUNICATE

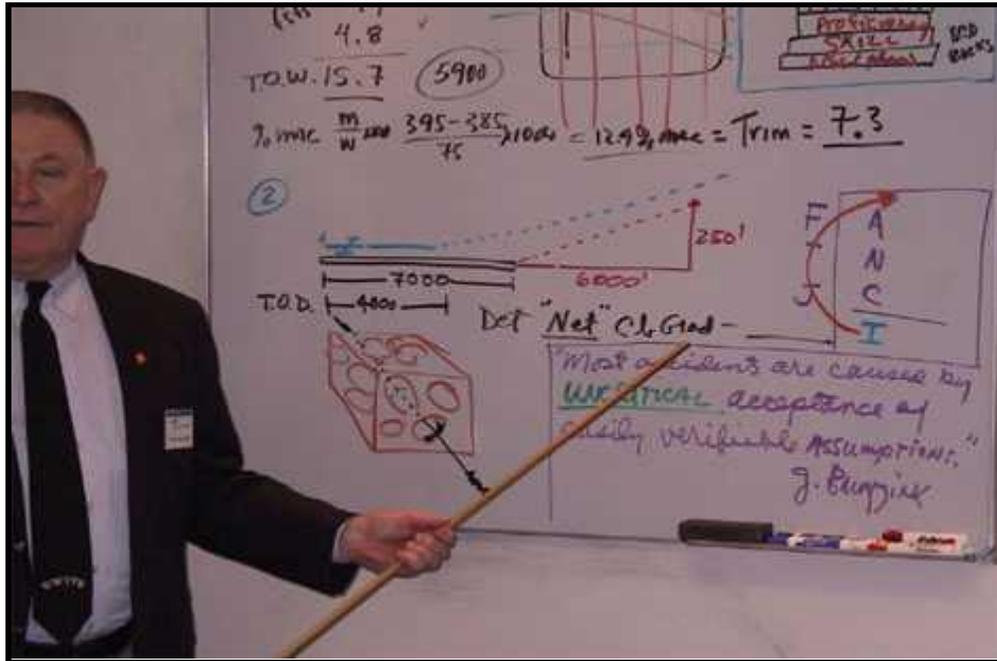
Our visiting PhD graduate and below the zone lieutenant colonel asked the class if he had a two feet by two feet block of Swiss cheese in his hands, what would the cheese look like? Of course, my students said it would have holes in it. He then showed with my long wooden pointer how from certain pokes he could slide the pointer into some of these holes and it would hit more cheese. Sometimes it would go all the way through. The layers, he explained are the checks we go through while flying. If the stick goes all the way through the airplane may crash. So, the checks, of training, attitude, maintenance, check lists, discipline, and 'error management' keeps the jet save.



You can look this up under DoD HFACS but you will need dot mil to get to it.

The picture below has, for our discussion in mishap prevention, three items on the board worth discussing and bringing out to add to our previous comments on crashing aeroplanes. See the three on the right side from top down as Kern's CRM Pillars are drawn out (we just discussed them), the red line showing **Instructing** has been moved up above **aviating (or airmanship)**. To the left is the block of cheese. The quote below my pointer would make a good tattoo:

"Most accidents are caused by uncritical acceptance of easily verifiable assumptions."



This quote is by Gerard "Jerry" Bruggink who was a Royal Netherlands Air Force pilot and later as an aircraft accident investigator.

Where in your flying experience 'when something happened' did you ask: What was that? What is that? Is that really what it is? What turned the light on? *What is the problem?*

Did you solve the problem before you called for the checklist?



You know why I am pointing the stick...it won't get shoved up some orifice if you Fly The F'g Airplane!

Somewhere we got the political correct word of needing to learn some Arabicisms – directed toward our “*sensitivity training*.” From somewhere promptly came the reply:

فأبقى يمينه من بلد عن آهق

(This will blow up and make into a very nice banner.)

ADDRESS REPLY TO
CHIEF OF THE AIR CORPS
WAR DEPARTMENT
WASHINGTON, D. C.

CONFIDENTIAL

WAR DEPARTMENT
OFFICE OF THE CHIEF OF THE AIR CORPS
WASHINGTON

May 22, 1939

SUBJECT: Flying Status for Flying Safety.

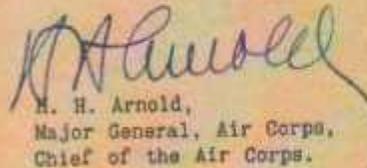
TO: Brig. General Arnold H. Krogstad, A. C.,
Langley Field,
Hampton, Virginia.

1. The Chief of the Air Corps is deeply concerned that senior and older pilots take no unnecessary flying risks and thus jeopardize their valuable experience to the Air Corps.

2. To this end he has directed the classification of all pilots over forty-seven years of age into a group where they will not be required to pilot at night, to lead or drill with pursuit formations, to fly single seater aircraft, or to do any other types of particularly hazardous piloting where the natural and understandable depreciations coincident with age may render them less fit than men of younger years. He believes that there should be absolutely no evidence of any competition in piloting among men of higher rank and older age. There is no necessity and no justification for the feeling on the part of a senior officer that he must continue to pile up as much pilot time, or to pilot as skillfully as he did in his earlier years, or as well as younger pilots do.

3. Your particular attention is directed to the revision of War Department Circular 26 and to the minimum requirements set up in Circular 50-12, O.C.A.C. Every senior Air Corps Officer must use the soundest judgement at all times as to the types of flying performed and as to when, how, and where to fly, after a careful analysis of tactical situations and weather conditions. Officers in the command pilot group may fly as co-pilots or command pilots in meeting their flying requirements.

4. It is desired that you be accompanied by another pilot on all military flights.

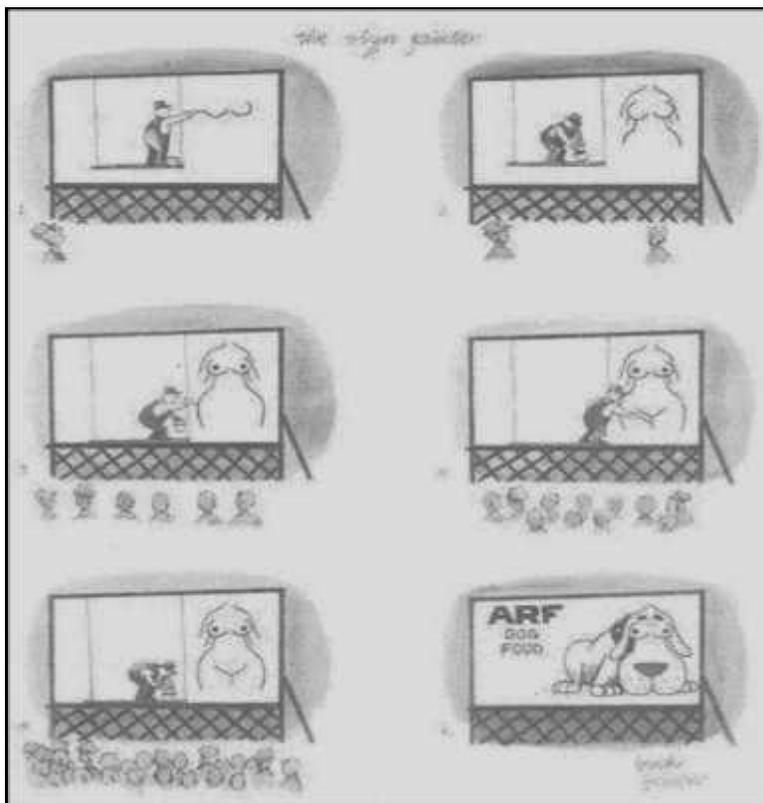

H. H. Arnold,
Major General, Air Corps,
Chief of the Air Corps.

24-6
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Read 2., line one - especially. Is this not great? From "HAP" the man, himself...



We had a nice lunch. (Seems like there were at one time a lot of Stuttgart stickers posted everywhere...)



Be careful what you assume...

Ideas, Thinking, and Group Problem Solving



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Let me ask you a question.

I have this small cardboard box here and want you to play the game called “What’s in the box?”

You have 15 minutes and 15 questions.

The first question of “Can I see what is in the box?” is “NO.” – you now have 14 questions left.

Would like to point out this little game was way up there near the top for more discovery learning with my lieutenants. We had some fun with this. I had added some drawings on three sides of the box that included a dog, a pistol, and the initials NFW. If I can find the ole box I’ll put a picture of it somewhere in this book.

Not many classes figured out what was in the box in 14 questions. Most started by just guessing and throwing out items of from speculation and wishing. I would chide their answers with rude comments to get them to “THIMK!” – as the expression goes. There is a small plastic/electronic ball³ I used to have that would go through the algorithms along with my yes/no answers and usually come up with the correct answer of “What am I thinking of?” Course, this box task is to get them to get organized as a team, determine the methodology, devise a plan of attack, with timer, score keeper, and recorder. It doesn’t take long to see the “correlation” of being in a cockpit and having a crew figure out what to do when something happens that may not be in some checklist.

One class of eight got this lesson handed to them in spades by the class leader who was real motivator of lieutenants - and a Lt. Col. I had asked him during a break to sit in the back of the room and not join in with the students but to take notes and then debrief the class when I told them “no cigar” as I knew they wouldn’t figure it out. I should have taped it. It was a splendid episodic adventure in having their asses chewed out – he was the Gunny in *Heartbreak Ridge* and General Savage in *Twelve O’clock High*. He did make an impression – and a learning impression on “who was in charge? Where was the plan? And should you get organized?” They won’t forget it.

³ See the URL for Radica 20Q by Mattel – from Amazon for \$37.22.

<https://www.amazon.com/Radica-20Q-Artificial-Intelligence-Game/dp/B0001NE2AK>

Methodology

My debriefs were to start on the white board and draw out some leading questions: You could ask if the object is man-made or organic, round or straight, or some other way, to cut your answers in half each time you asked a question.

A. I would put 1 through 16 numbers on the white board:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Then asked one student to pick a number. Picked another to ask, for example is it greater than 8?

If yes mark out the first 8 numbers. Then is it greater than 12? If yes mark out 9 -10. Is it greater than 14? If yes then pick 15 or 16 and you will have the answer. The drill is cutting everything in half.

B. I learned the next method from a student – promoted him on the spot. His innovation was to have someone think of a word. Another student would place my very large class lexicon (2,720 pages, made Japan – I think) in front of him and open it to about the middle of the book. This would be about the letter M. Then ask does the word begin with a letter A through M? if so, open the book half way between A and M – and ask if the word begins with A through F (or about – what ever it is). Then when the first letter is determined find out the second letter the same way. It is a very short time until the page is found, and then the column, and then the word...piece of cake, noting everything is being cut in half with each question.

C. Now, we can go back to the little brown box. So far no one has gotten the answer. I tell the class we are going to do it again: 15 questions and 15 minutes, except I will add “what is in the box is in this room. What is your first question?? [note to interested reader – What is your first question?]

This generally takes a little guidance or encouragement to start thinking together and ask the first question – which is “Is it in this west side of the room?” – or the first half in another direction. It goes half to half to half (even a half vertically) until, as it added up, to a very small area from my speech box up to the ceiling which had in it only a light fixture. When they say **lightbulb** they win. I did have a backup in case someone – it did happen one time – where someone had been told what was in the box. Course, I pulled out my rubber duck. The joy for me was seeing the few end up with the correct answer in less than 15 questions because I could then throw the box at them and let them dig it out.

The credit for this drill comes from a post graduate course in psychology I took at UNT where the professor held up a light bulb and said “Ask me a question about this bulb.” He then spent about 30 minutes answering all there is to know about a light bulb. We learn by asking questions. The more questions you ask the more you will learn.

Asking questions is another way toward Discovery Learning. The Inquiry into what is in the box is a way for an instructor pilot to appreciate having a plan for finding answers rather than “just guessing.”

ANOTHER ZINGER SHEET!

Great Country "ZINGER" Sheet Log				156X
I TRIED TO SING - INEFFECTIVE - UNAPPROPRIATE - FLYING	LET'S GO DON'T GET MAD JUST GO TO SLEEP	BEHIND US IS THE ONLY YOU UNWILLING MOTHER'S	AND THEN WE GOT INTO IT	PLAY 4 -- HAPPY FOR ME AND "H" YOU
EVERYONE LEAVES DIFFERENTLY	WWW.GREAT.ABT	POSITION CHANGES IT TAKES ONE AN HOUR AND ONE COUNTRY	APPROXIMATE - APPROXIMATE - FOUR ONLY	WINGS AND IDEAS CAN CHANGE THE WORLD.
WIDE AND BROAD TEXT - COVER ALL IT IS THE ONE	DON'T WASTE TIME A GUY OUT FOR SURE HE IS NINE	BOX OUT WHAT THE STUDENT WANTS AND THEN TO THEIR LEVEL	GOD BLESS THE REARVIEW OF JOHN BOYD	THE GUY WHO GETS ON AND YOU WILL CONFIDENT & MORE WHY WOULD YOU DO IT?
ONE OF THE LIVING BEASTS AND CHALLENGE MUSIC	YOU CAN SAY "I" IN YOUR MINDS, BUT YOU CAN'T SEE "I"	YOUR ALL IS A SCARE	GRASS - GREEN IN A WHITE TOWN IS EVEN ALL I CAN STAY	PUT ON YOUR CLOTHES AND GOIT BIRTH ... I SEE IN MIDDLE
YOU CAN'T TALK TALK AND STAY YOU	APPEAL TO EACH YOUR AUDIENCE AND YOUR LIMITATIONS	PULL ON THIS LAST!	ONE LONG WORD	PUSH IT UP, PUSH IT UP BUT DON'T GO SWITCH TO FOOT - 10"
HOW MANY TIMES YOU CAN BEHOLD AND ARE LEFT	"THE LAST ONE" - ENDING	PAY ATTENTION!	I THINK YOU WANTS TO ONE THE ONLY "I"	IN THIS OF THIS SHIT!
YOU WILL HAVE OTHER LEADERS AND BY LIVING TEACHING	I WANT TO DO ONE FULLY AND FINISH	ONE I DON'T WOULD SEE A GUY	THEY DON'T "WANT TO"	"FATE IS THE NUMBER" BEST GAIN
DON'T SAY IN THE A GUY BUT IN YOUR POSITION	PUT YOUR BEST FEET ON THE TALKING AND ON THE STAGE	ONE WIGGLE AND ONE DOESN'T	WHAT MATTER IS HOW WE LEAD ONE "BEST"	SEE HOW YOU SHOULD TO BEING, THE LESS YOU BEING IN CONTACT.

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ESSENTIAL
MATERIAL