

**Onthou (Remember) series**  
**SA228**

**ENGLISH TRANSCRIPTION OF EPISODE AS BROADCAST ON YOU TUBE**

Narrator:

For many people, aircraft remain wonderful things. Since the days of the Wright Brothers more than 100 years ago, people cannot help but remain fascinated by these machines that have made our planet so much smaller.

This is probably why so many people had arrived in Windhoek to see South African Airway's newest airliner prepare for take off. It was the 20<sup>th</sup> April 1968. The aircraft was a brand new Boeing 707 aircraft named "Pretoria"

Mark Young – Author: A Firm Resolve

The Pretoria was the newest 707 that South African Airways had in its possession at that time. It was just six weeks old.

Sakkie Van Der Merwe – SAA Captain (Retired)

The 707 was the first large passenger transport jet developed in the world – that and the DC8.

Mark Young

The Boeing 707 was announced in 1957 by Boeing. South African Airways got its first 707s in 1960.

Sakkie Van Der Merwe

There in the late 50s – 1959 to 60 – when the 707s came out, Pratt and Whitney were in the early years as regards the development of modern jet turbines. With the B model (of 707) they changed the hydraulic systems. With the C model they made tremendous improvements such as better fuel consumption and longer range – they gave us a number of advantages.

Mark Young

It had 4 engines. SAA at the time used Pratt and Whitney engines and even today most SAA aircraft use Pratt and Whitney engines. It's an engine that is extremely reliable. The 707 had a long range, it was spacious inside and could handle more passengers than most. Depending on the configuration inside it could carry up to 150 passengers and it also had transatlantic range without refueling.

Sakkie Van Der Merwe

Just before the 707s we flew the DC6, the DC6B and the DC7s. We also had the Super Constellations which the guys on the Australian route flew. They flew via Mauritius, Cocos and Perth. With the 707s we simply flew Johannesburg, Mauritius, Perth.

It was while we were in this jet learning phase with the 707 that you got the A model, then the B and eventually the C. It was, at the time, the jewel in the crown of Boeing's creations.

Mark Young

SAA used the 707 almost from the first. Their first aircraft were the 707Bs. When the 707C came out SAA was one of the first clients for the new machine.

Sakkie Van Der Mwerwe

What distinguished the 707 from models like the 727 and the 737 which we used in preparation for the 747...the seven-two and the seven-three all had hydraulic controls. In other words on those if

you commanded roll then you sent a signal to a hydraulic system that controlled the aileron and other surfaces remotely. The strength of the signal was adapted by a system which we termed the Q-Spring. It adapted the signal according to the speed of the aircraft and then it sent the appropriate signal to the actual control surfaces. It makes modern jets relatively easy to handle...to fly.

You did not have this on the 707. If you moved the yolk to roll then there was a direct coupling via a cable from the yoke to the aileron...to the wing...the elevator or the rudder. It was a direct coupling.

So the 707 was a heavy aircraft. If you turned the yolk then you waited for the aircraft to follow your input and also when you leveled out again. So it was something to adapt to in order to fly these aircraft.

The 707 had an exemplary safety record – like all of Uncle Boeing's aircraft. Boeing builds a fantastic aircraft. I will die a Boeing adherent. I have flown a bit on Airbus and it's an impressive aircraft but in regards to sheer strength and their ability to handle extremes it's hard to beat Uncle Boeing's aircraft.

Mark Young

So the aircraft itself was extremely reliable. It was extremely popular. Virtually all the international airlines of the day used it and it had a very good safety record.

Sakkie Van Der Merwe

When a 707 climbed away then you could see 4 black smoke trails...each engine left a black trail. We used to tease the technicians and say they needed their rings renewed because look how they are smoking! It was simply incomplete combustion of the fuel.

Those old jet engines used to make a lot of noise. Especially if you heard one take off on an overcast evening at Jan Smuts airport it was like someone tearing canvas. It used to reverberate for quite some time.

The 707 was the aircraft that really heralded and launched the era of passenger jet transport for the world.

Narrator

It was 42 years ago that the third and newest iteration of Boeing's successful 707 aircraft joined SAA. This was one of its first flights. For passengers and crew alike, it was a privilege to travel in this mighty machine.

Mark Young

The aircraft took off from Johannesburg airport -at the time called Jan Smuts airport. They landed at Windhoek and the passengers destined for Windhoek disembarked. There were a lot of people who remained on board for the flight to Europe.

At the time SAA flew to Luanda after Windhoek. From Luanda they went to West Africa and then on to London. At the eventual end of the flight the aircraft was due to arrive in London the following morning.

Sakkie Van Der Merwe

When you got start clearance...you asked the tower for permission to start...you give them the passengers, the crew (numbers)...in those days you gave them your endurance...how long you could remain airborne...your destination...and you also ask for a flight level....it varied from time to time

from airport to airport.

Mark Young

When an aircraft takes off there are a number of decision points. Usually before you enter the runway you need permission. You ask this permission and ensure that you are allowed to enter the runway so that you can start to take off.

Sakkie Van Der Merwe

You will get permission that says OK you are clear to start, call me when ready to depart. Then you read through...you go and...the engineer, he has his procedures...he switches certain pumps off to reduce load on the batteries...he switches other stuff on and ...the cross-feed of air pressure as the engines are started with air pressure...and when he is ready...and everyone else is ready then you call OK, before start check-list.

Then you read...err or pre-start check list...and every person when you read..the one responsible for that action must respond...you, the engineer, the captain...and you read every single thing on the list through. When you are done with the list you put it one side and the captain will ask, OK, get us taxi clearance.

Then you get clearance "Springbok 280 taxi clearance?" then you get your clearance..they say to you....although today you first need clearance to push-back...procedures now are just a little bit different.

In those days you could simply taxi directly out of your parking spot and taxi directly to the runway. And then you get your taxi check list. It's a compulsory check list you complete as you go to the start of the runway.

Then you get other procedures that you go through but as the captain calls "Taxi Checklist" then you get it and read it and call it and each man answers his item and when you get to the start of the runway threshold then you tell the tower "Standing by take-off or Ready for take off."

Mark Young

On that particular evening Mr Willemsse who was official in control of the tower gave SA228 permission to taxi to the runway and take off when ready. Normally at a busy airport this is not done but there was no-one else using the airfield at that moment.

There was, of course, that Beechcraft flying at 9000 foot but that posed no immediate danger to the 707.

So, after they had completed their taxi, and they were on the runway and interestingly the crew of the 707 contacted the tower to ask "Are we clear...are we cleared on and off?" and he said "Yes, you're cleared on and off."

And then they proceeded.

If we include the crew then there were 122 people on board the aircraft.

Narrator

In Windhoek the time to take off had arrived. In the terminal friends and family of the passengers watched the aircraft. In the cockpit, with final clearances obtained, the captain was the one who in all probability pushed the throttles to full power. The Pretoria was ready to take off to Angola and thence further onward to Europe.

Sakkie Van Der Merwe

Once they tell you “OK, the other guys are off the runway, you are cleared for take off.” and perhaps he will give you a further instruction such as contact the tower on 118-1 after take off ...something like that...sometimes its part of your standard procedures once you're in the air...

The first thing as you roll down the runway...as soon as you pass your first speed...we had different speeds...your first speed is the speed where...we call it V1...that's the point at which you have enough runway left that if you decided at that point to stop...you can stop before the end of the runway.

Mark Young

Then you wait for what we call V1..now V1 is the position where you need to decide are we going to take off or are we not going to take off because beyond that you do not have enough runway over to bring the aircraft to a stop without...without...sorry...without rolling beyond the end of the runway itself.

Sakkie Van Der Merwe

Once you pass that point, then you do not stop. If something goes wrong after, then you take that problem into the air.

Mark Young

When you get to V1 then the captain or co-pilot calls out V1. Now you are committed. You must take off. However you stay on the runway until the speed reaches V2. Now V2 is the speed at which the aircraft will still fly even if one or two engines fail.

Sakkie Van Der Merwe

Then you get V2 - “Rotate!”. At V2 then you pull...the captain or the first officer whoever is doing it, pulls the aircraft off the ground...

Mark Young

When you are at V2 then you pull the yoke back to lift the nose.

Sakkie Van Der Merwe

As soon as you are off the ground and you have positive climb...you confirm that you have positive climb then you say “Gear up!” and then the man pulls the undercarriage up. As soon as the gear is up then one of the men says “Gear clean!”.

Mark Young

Now you would first get the aircraft in the air...they retracted the undercarriage very quickly...and it was effectively within two or three seconds...

Sakkie Van Der Merwe

And as you climb away and the undercarriage is up then you wait for a 1000 feet then you put the nose down a bit and get your speed up then you pack away the flaps.

COMMERCIAL BREAK

Narrator

The man behind the controls was Captain Eric Smith who was on his last international flight. With more than 20 000 hours to his name, he was one of SAA's most experienced pilots. He was, however, about to retire after a successful and safe career with the airline.

Mark Young

The pilot in command was Captain Eric Smith. It was his last international flight.

Sakkie Van Der Merwe

Eric Smith was a very competent man...huge experience...but he came out of the propeller era...he flew a lot of propeller aircraft and he converted to jets...the 707 was of course the first jet aircraft we got...

Mark Young

He had more than 18000 hours...4600 were in the 707 series...but he only had an hour and 20 minutes of experience on the 707C...because it was a new aircraft.

Sakkie Van Der Merwe

On average you flew about 500 hours per year...the average guy piles up about 500 hours...some men fly a lot more but there are legal limits to how much you can fly...

Mark Young

The cockpit crew at that time consisted of 3 members...

Sakkie Van Der Merwe

In total you had the commander, your co-pilot, your third pilot...and the flight engineer..

Mark Young

You had the pilot, the co-pilot and the flight engineer. The first officer was a certain Peter Holliday and the flight engineer was Philip Minaar.

Part of the work of the flight engineer was to distribute fuel evenly throughout the aircraft as it flew as as it is used it affects the balance of the aircraft.

Sakkie Van Der Merwe

The men who flew at Windhoek...the men who flew the Pretoria at Windhoek were experienced hands...the system worked as follows....when you joined SAA as a pilot then you started as what we called a "boy pilot"...Yes, you come from the air force and you think you are the cat's beard but now you're at an airline and you start at the bottom.

The first officer...the third pilot, the boy pilot...had just recently come out of the air force...he left shortly before I did...left the force to SAA....so as regards his airline experience...he did not have much but he had thousands in experience in the air force so he was also a capable, conscientious pilot. The same with the captain and the first officer...the senior first officer seated on the right.

Narrator

Even experienced men can sometimes make mistakes. What was supposed to be routine was about to go horribly wrong for the men on duty in the cockpit that night.

Mark Young

You would first get the aircraft into the air...they retracted the undercarriage very quickly...and that was in fact within two to three seconds (from lift off)

Sakkie Van Der Merwe

And as you climb away and the undercarriage is up then you wait for a 1000 feet then you trim the

nose forwards a bit and get your speed up then you pack away the flaps.

Mark Young

The aircraft climbed to 450 foot ... at 450 foot they retracted the first notch of flaps which should have been at 650 foot because the 707C took away more flap than the 707B...but we must remember that for Captain Smith 98% of his (707) career was on the 707B where you retracted the first notch of flaps at 450 feet.

Sakkie Van Der Merwe

“Safety is no accident.” And that is a double barbed thing...safety is only there as long as you can avoid the point of the first weak link in the chain...usually you have the one weak link followed by another weak link followed by the next weak link and then there's an accident.

We cannot say that this was the situation with the Windhoek aircraft...it was merely a tragic circumstance...

Mark Young

What happened there is that Boeing, for good reasons, changed the settings. When you took off in the 707B you retracted the flaps at 400 foot above ground level and then later, at 1000 feet, you retracted the second notch of flaps. On the 707c there were not three notches of flap, there were only two and you were supposed to wait until 650 feet before removing the first notch of flaps.

And the aircraft rose to about 650 feet and then started descending. And it carried on descending as the (vertical speed) increased to about 1000 feet per minute by the time it had descended and impacted the ground.

Basically what happened there when the pilot retracted the first notch of flaps at 450 feet, he lost more flap area than he was used to. In that period of time the cockpit crew were vary busy going through the after take-off check list. They most probably saw other lights (in the air) and checked to see what was going on there...

Another aspect without a visual horizon or reference is that your senses tell you that a descent is an increase in speed. Now the 707C had more powerful engines so if you had the impression that the aircraft is accelerating faster than the rate which you are used to...it would not have seemed unusual...you may have expected it...because it's a new aircraft with new engines and that could have been a natural assumption up to the point where you might have seen a light on the ground is rising in view in the windscreen...then you may have been aware but by that time there would have been no chance for them to recover the matter.

Sakkie Van Der Merwe

When these chaps took off from Windhoek...the acceleration was so immense...and because they took off in pitch darkness...for some reason they climbed to about 700 feet...which is very quick...a few seconds...and for some or other reason they let the nose drop...began approaching the ground again and for whatever reason they realised the aircraft was busy descending and they pulled back...and when they pulled back it pushed the tail into the ground.

Mark Young

From the time they left the runway to impact was less than 50 seconds...so they had an extremely short period of time at their disposal during which they could have done something...

And of course during the disaster there were a lot of other events that took place...the cabin broke in two pieces...many of the seats were not made to the standards of today...currently you must have a

seat that can withstand 15G...in those days it was 3G...

So with the force of the impact many of the seats were ejected from the aircraft...they fell into the veld and there was a lot of fuel there from the aircraft which ignited...many of the people died in that fire....they were not necessarily killed by the aircraft's impact.

## SECOND COMMERCIAL BREAK

Jan de Waal – former SA police officer in Windhoek 1968

I was in the police...at that stage I was on my way to my sweetheart...about 6 blocks from the barracks where we used to stay...it was...let me say...about in the region of nine 9pm...I was on my way walking back to the barracks to go and sleep and it was still a block to go and the sector sergeant on duty stopped next to me and said “Get in!”.

And you get in the back of the police van and you didn't even have time to go and fetch your clothes because a message had arrived about a Boeing that crashed at the airport and the airport is still another 32 kilometers outside Windhoek.

Let me say that as a youngster...at that stage I was only 19 years old...you do not really have police experience...you only realise what they told you during the journey...and there were about 8 of us in the back of the police van....8 policemen in the back of the van and you begin talking...and you realise what is going on.

Some of the guys had previously dealt with bodies...but for me...for many it was our first experience with bodies....and all of us that were rounded-up...I was perchance one of the first to be rounded-up...we were all taken on the same trip out to the airport.

And they had...at the two drive-in cinemas...at that stage I think there was still only one drive-in...they stopped at the drive-in and made an announcement over the cinema's loudspeakers...there had been a Boeing accident and all policemen that might be in the drive-in had to report to the police station.

Let me say that when we came to the scene...now it was...to the East side...about a kilometer or two...the distance from the airport where it crashed...

Narrator

Barely a kilometer from the end of the runway laid the remains of the Pretoria, her crew and passengers.

Moments before the Boeing 707 was one of the most modern aircraft in the air and the pride of SAA. Only fifty seconds after the wheels left the runway surface, came the impact and it totally destroyed the once mighty jetliner.

Jan De Waal

Right...now it's chaos at the scene...its dry in SouthWest at that stage...it's winter...not really winter but April...dry ground...hard ground...as it impacted you got a furrow...I'd say about a meter (deep)...about 3 or 4 meters in length...a furrow it made in the ground...and it apparently lifted up again...if that was due to the shock of impact or whatever but it lifted up again...and about 10...15 meters further on you got 5 stripes of the two engines either side and the fuselage in the middle....also about a meter deep...furrows...and then the one wing broke off...the right wing.

Sakkie Van Der Merwe

And he and I flew over the scene...it was on the extended middle line of the runway...very close by...about a kilometer if I remember correctly...

You just saw the wreckage lying there and the deep furrows in the ground...where the engines burrowed in...and it's an eerie feeling...

Jan De Waal

The fuselage...it turned and ...well basically in the middle...it broke...well more towards the front. Totally broken where it divided in two...

Mark Young

The one wing broke away and flew over the fuselage....well it basically was still flying...and because it broke away all the fuel lines were ruptured and the leaking fuel ran back to hot components and it ignited.

Jan De Waal

And it broke off and both its engines...or one of the engines...was found off to one side in the veld but the wing that broke away ran on for about another kilometer into the veld and it burnt out completely...well let me say the next morning there was just molten metal lying there.

Mark Young

The scene was not pleasant. There was wreckage spread about...at the time they said for about 5 miles....nowadays that's close to ten kilometers.

A hundred and nineteen died in the disaster...or within three or four days after the disaster...because there were a number of survivors pulled from the wreckage...and interestingly there were two or three that were almost unharmed...and found in the wreckage.

Sakkie Van Der Merwe

And yes...as we know..there were only 5 survivors...one effectively got away Scot-Free...he walked away from the aircraft...when he came-to he saw stars above him and he was unharmed...but other people were severely injured and of course the majority of the people died in the accident.

Jan De Waal

Now wonder of wonders...there was one guy...I think there were 5...yes. I think there were 5 that survived...

Mark Young

The one witness (survivor) description of the disaster...one chap was reading a book throughout and he said it felt as if the aircraft was gliding along the ground...a bit rough but he was not aware of it until the lights went out and he was upside down.

Jan De Waal

Now there was one...now I speak under correction...but one died on the way to hospital as well...of the other four three were pretty badly injured...but there was an Englishman...I cannot recall his surname now...he didn't have a scratch on him...let me say he was a bit disorientated and was wondering about the bushes...we had to catch him...his most serious injury was due to wandering through the bushes...

Now you have to think about this...for this chap who has just come out of a Boeing disaster to be put in a helicopter for transport to hospital...and the chap is fully aware of things...he is awake...that

was a bit of a battle...at the end of the day we wrapped him up in a blanket and bound him with belts so that he would...at the very least...not become physical in the helicopter.

What...what...let me say, what affected the people there the most was the smell at the scene...

Sakkie Van Der Merwe

If you walk around there...that smell that hangs in the air its... unusual....and the big tragedy is that it is as if it won't sink-in...I think its like that with any disaster...like it has been with all the disasters you have covered in this series...it does not want to register with you...it's not possible...somewhere something's wrong.

Jan De Waal

Lighting was a problem...it was in the veld on a farmers land...the only light you had was the vehicles that were there at the time and each chap had a torch...that was the lighting...

Now if I tell you my own experience...you arrive at the scene...you do not realise what has taken place...you are completely...and then suddenly you see...you see this bunch of...the entire place is scattered...you see parts of people...and a hundred plus scorched bodies...not badly burnt...oddly not one was totally consumed...they were just scorched...just enough for them to swell up...

if you think...for example...you go to a body and you make to pick it up...you think you have it but the skin peels away to the wrist...all of them scorched to the point of blistering...

And the smell of the scene...I do not know if the smell was caused by the type of fuel that made it worse but the smell...the smell was really...incredible.

Mark Young

An interesting aspect is that the fuel in a jetliner is not the fuel you use in your vehicle. Interestingly it's basically what we would term paraffin...Jet A1 is basically paraffin. It's that smell you have when you are an airport.

Jan De Waal

Policemen, municipal people, security and airport people...as time passed....through the night,,they became more plentiful...

You get a guy and his head is gone...his tonsils and tongue is here...that's the bodies which you picked up there...

The bodies...well let me say not bodies but parts of them...

The largest percentage...if I think correctly...of all the bodies we recovered...there was one man that had shoes on...

Sakkie Van Der Merwe

The one flight attendant...and it sounds a bit gruesome...but there where the wreckage lay...she...some of the wiring...was around her neck...she was suspended right behind the cockpit.

Jan De Waal

One of the hostesses...she was apparently still standing with the microphone in her hand...probably busy with announcements or notifications...the wiring of the aircraft caught her here behind the jaw...so that she was hanging on the wiring with the microphone like this in her hand...

Sakkie Van Der Merwe

Now that is abnormal because your crew, the entire crew, is buckled in at that point. During take-off everyone must be buckled-in. For some or other reason that young lady was not buckled-in. Now that is one of the grey areas of that Windhoek accident. Why was she not strapped-in?

Was she perhaps the reason that they turned around? To see what's happening behind them? Why was she not strapped-in? That's one of those things we will never know.

Jan De Waal

It's a whole bunch...if I think of it now...a lot of gruesome things...we found body parts in the bushes...and later took them to the ambulance.

In that moment you stand there in disbelief. What you see here in front of you is basically impossible...what is in front of you...

Let me say...when you get to the aircraft itself...you do not realise...let me say you realise then how huge the thing is...clothes hung in trees...babies' nappies...it's...

What was heart wrenching was the small children...Oh...mutilated...broken...

There...from young to old...there was not a policeman that did not shed many tears that night...or that night and the next day...from hardened guys who reckoned well they've been in the force for years...there's not really anything that can get them down...no...there...there...from stranger to relative...let's just say there was not a person on the scene that did not cry.

The next day, at the farm gate where you went into the area of the farm where the Boeing crashed, they erected a police tent.

An Engelbrecht guy and I...we had to stay there in the tent for a week because no journalists or anybody else were allowed on the scene.

Now that was also not a pleasant experience...you are parked there in the tent both day and night on the scene...and it was the third day I was walking around...well you walked around there every day and looked around...and see what else there is to recover...and strangely everyday you found either another piece of flesh or something...a piece of clothing...and that is when I found this little table cloth...let me say I was walking and I saw it hanging up there like a little flag.

Obviously it was full of blood...there were blood marks but naturally my wife thought it best...well you best not store it with blood...it's 42 years ago...but this is a tablecloth from the Pretoria...it's...and it's of immense value to me.

### THIRD COMMERCIAL BREAK

Narrator

The tragedy of the Pretoria took place in an era before voice and data recorders became standard equipment on all jetliners. The result was that the shocked investigators on the ground were forced to make logical, step-by-step deductions to try and discover how a brand new, highly advanced passenger aircraft came to such a fate.

Sakkie Van Der Merwe

Immediately you start asking "How is it possible?" Because you know of all the procedures we go through to make sure safety is maintained...because we know...we polish it all the time.

And when you get into that simulator...it's the thing that gets drilled into you the most...flight safety.

Mark Young

I started investigating the Pretoria just after I started research on my book. My book started with the Helderberg and then it expanded...as I spoke to people about the accidents I got the feeling from a lot of people that the Pretoria was the victim of a bomb.

If we consider the political scenario of the time then it's perhaps not strange that people thought that and perhaps it suited some to let that idea grow. Naturally they looked for Freedom Fighter's activities...it was one of the first things the government wanted to in or exclude...and they could not find any evidence that there was a bomb on board.

Jan De Waal

Now were all...nobody had any real knowledge about aircraft...there was a lot of speculation...the newspapers were full of it...

Now OK a person has...well...at the end of the day everyone went to the pilot...everyone blamed the pilot because he was the man in command...but later the flaps became a discussion point...let me say with our layman's knowledge we couldn't really...and I can't recall that we really had discussions...Yes, "How did it happen?"...but no one could really come to an answer among us...if you speak of the policemen...no-one could really give an answer.

Yes you wonder what could have happened...could this...but...no...our knowledge of aviation was not such that we could properly speculate about it.

Mark Young

The investigation team of SAA looked at the engines. They were obviously very hot as the sand had turned to glass on the exhaust vanes of the engines...however even if the engines stopped at 450 foot they would still have retained enough heat to have this effect.

Sakkie Van Der Merwe

And when it hit the ground then it pulled the engines in...because you could see it...we went to look...there where it hit the ground...could you see the first part where the tail struck and then where the engines struck were the four furrows that the engines cut in the ground.

Mark Young

So there was a certain Mr Warder at SAA's technical division in Johannesburg that took the transmitters on the engines that reflect the position of the throttles in the cockpit...they transmit it to the engines...but they re-set to zero on impact...but he dismantled these things and very carefully...painstakingly...using a microscope...he determined where the springs and the mechanism was set on impact...and when he extrapolated that he determined that all the engines were effectively at 98% power.

Now that took them a few months but they could say with certainty there was no problem with the engines.

So they went further and they found that in the cockpit the after take-off checklist...which the crew must follow...have you set the flaps, have you retracted the undercarriage, have you set the compass correctly...they discovered it was practically...well already two thirds completed in the 20 to 30 seconds they were airborne so they were naturally very busy in that cockpit...

Unfortunately this aircraft did not have a cockpit recorder although it was law and SAA had

regulations saying they had to have one but the particular model SAA had specified was not yet available...unfortunately we will never know precisely what transpired in that cockpit.

Sakkie Van Der Merwe

Now we can only be theoretical about it all...it's possible that they took off with the wrong flap setting. I doubt that however as the aircraft would not have risen so easily into the air unless they pulled up so steeply that they stalled it and made it drop back to the ground...

Narrator

So it was soon clear that a closer look at the flap settings of the Pretoria would be needed. But what are these flaps and what is their purpose? For the layman it might seem unimportant but Sakkie Van Der Merwe explains why they are so critical.

Sakkie Van Der Merwe

A flap setting on an aircraft...if we look at this Spit(fire)...it's wing has a specific shape...it's like a tear-drop...now what happens when the air flows over the top half of the wing is that it must cover the distance from the front of the wing to the back of the wing in the same time as the airflow that is running past the wing because this thing is moving through the air mass.

So for that air molecule to reach the same point here at the back as its brother that is moving past the wing, it must move faster and because it moves faster it lowers the pressure on top of the wing...so as that air pressure drops it literally sucks the wing into that area of low pressure and that's what makes a wing fly.

Now as you accelerate your aircraft and you only have this one shape, at a point you run into a problem. As the airflow accelerates it gets very close to the speed of sound and it builds up...what we call a shock wave. What you do with a flap setting...your wing must be specially designed to avoid running the risk at high speed of building up this shock wave...so that tear-drop shape it has must be very flat...because at a high speed you do not need a deep shape to build up a good low pressure area above the wing.

Now how do you work to develop that same lifting ability on that wing at a low speed as you have at a high speed?

You do it by adapting the wing. You literally make it look like this...so now that air molecule has much further to go.

And that shape from here to here...we do that with flaps...a set....it looks like a set...mini-wings that move down at the back of the wing and it literally changes the shape of the wing so that at a low speed it still develops the same lifting ability so that it can get the aircraft into the air.

But as soon as you are in the air then you...you begin...as we say you pack the flaps away...you reduce the flaps...but before you can do that you need enough airspeed so that the reduced bending can still have the same lifting ability.

So you accelerate the aircraft as well...usually our first reduction where we packed away on a Boeing if I recall correctly was at about 190 knots...170, 190 and 210...of the different classes...it depends if you are taking off with 15 or 5 or 2 flaps...every flap setting gives you a different lift coefficient.

However, the price you pay for lift is drag...so the more lift you develop, the more drag you get...so the minute you put away flaps you get less drag and the aircraft accelerates easier and that is why

we take off with different flap settings.

Now this is where the difference between the B and the C model came...their flap settings were slightly different.

The effect is more noticeable when you extend the flaps...especially if you are flying manually and you ask the first officer or captain "give me flap 1 or flap 5" the moment he sets the flap you immediately feel how the aircraft rises up...

Mark Young

Later they took another of the new 707s and loaded it with sand bags to replicate the same load as the Pretoria had. They took off and retracted the flaps at 450 foot...the aircraft rose to about 600 foot and then began descending...and the crew had to be sharp to save that aircraft...they almost had another disaster but they discovered that this was definitely the problem...they had reduced the flaps too soon.

Sakkie Van Der Merwe

Either they took away the flaps at too low a speed...for whatever reason...we don't know...it's one of the two things we don't know...if they began taking away flaps too low...in other words they began cleaning up the wing as we say...you see the things rolling into each other...if they cleaned the wing too quickly then the aircraft would sink to the ground.

Mark Young

Other things that contributed were that Captain Smith was on his last flight...that is not a problem of itself but he had recently received glasses and he had the habit of looking more closely at the panel to ensure that he had read it correctly...

On the 707C model Boeing had the position of two instruments...this was the altimeter and the climb and descent meter..they swapped these on the panel.

From force of habit he would have looked at a particular place to see if the aircraft was dropping or not...but now that instrument is not there...it's now somewhere else...now that's another few seconds...now he must look again and perhaps look a bit closer to make sure...if you add those to the seconds that they perhaps used to look out for other traffic that was there then you can work out how they came to a point where they could not save it.

So it's a whole confluence of circumstances that led to the loss of Pretoria.

What happened? What can we do to prevent it happening again? They do not approach the problem to blame someone. An air accident investigator will go and find the facts, how does the entire thing, the puzzle fit? And how can we make sure that something similar never happens again?

It's interesting that, to my knowledge, no other 707 has been lost due to the same problem.

There will be huge headlines. (About and accident). There will be lots of emotional stories and that is understandable but the problem is that they never tell you is how many thousands of airliners take off and land daily without problems...

In my book I say throughout, an air disaster is not due to one thing that leads to it...it's a bunch of things that, one after the other, on the same day that occur with that particular set of people that are behind the control column...if tomorrow or the day after you have half of those occurrences or factors then you do not have a problem...but on a specific day if they all take place after each other

and converge then you have a problem.

Sakkie Van Der Merwe

When something like this happens you say “But it's not possible! It's not possible! How can it happen?” and then you go through the process and you say “Yo!” if you look at it now...the same...”There but for the grace of God goeth I.”...I could also have made the mistake.

Jan De Waal

You get the most horrible nightmares...when you fall asleep...you...everything you see in your subconscious...everything revolves around it... easily for a month...two months...where you...it's hard to sleep at night...you just sleep...you just fall asleep then this is all in front of you as if you are standing there...it's difficult.

After 42 years...I mean...let me say...as I sit here now it's really...the emotions come back...it's...after 42 years it's still not pleasant to talk about it let me be honest...if you take everything...and a person tries...a lot of the detail you have forgotten...you try...but the more a person thinks the more detail comes back...

It's really still not pleasant to talk about it all...that's my experience.

Just from a conversation...long after the event...you are standing and chatting...then you see a guy just turns away and shakes his head...no. It was...it was...definitely not pleasant.

I cannot think how any of the men who were on the scene would ever forget it.

Let me say I...even if I drive near an airport...it's the first thing that comes up.

No...you are never going to wash it out...there's no way.

Narrator

Now, nearly half a century after the Pretoria was destroyed in such tragic circumstances, the memories of the people that perished with her are beginning to fade.

To trace eye witnesses and family members so long after the fact was virtually impossible and yet, every person that gets on board an aircraft should be thankful to those who gave their lives that night because it is due to them, and every other person that has died in an air disaster, that airliner travel is so safe today.

END CREDITS

