



RECORD OF CONVERSATION

All persons listed were interviewed by Zoë Keliher

The following is a summary of conversation:

THOMAS LEWIS (ACCIDENT PILOT)

Mr. Lewis stated that he scheduled the airplane two hours before the passengers arrived at the airport because he wanted to do a short flight, about 0.3 hours, before they arrived. When he arrived back at the airport, he had North Gate Aviation top off the airplane with fuel and then met the passengers. Nothing was out of the ordinary and the weather was perfect for flying. The taxi and takeoff were normal and he had the fuel selector positioned to "both" wing tanks. Throughout the flight, and he was explaining to the right-seated passenger different aspects of the airplane and giving a broad-brush general instruction. There was light turbulence and they would experience orographic lift as they neared the mountains.

He continued toward Mount Shasta and climbed to about 11,000-11,500 feet msl. At that altitude, he configured the airplane with full throttle which corresponded with the engine gauges indicating about 18-19 inches of manifold pressure producing 2,350 rpm. As he climbed that altitude, he would rotate the mixture about half turn per 1,000 feet of altitude in an effort to lean the engine, which he normally tries to be lean of peak. As they started to circle the mountain, the pilot asked the rear-seated passenger if he wished to continue the flight around Mount Shasta or if he wanted to turn back to Chico. The passenger responded by saying that he wanted to continue to do the entire 360° tour around the mountain and complete the trip. The pilot recalled that he monitored the exhaust gas temperature (egt) and cylinder head temperature gauge which gave normal indications of about 1100° and 350°, respectively.

As soon as the airplane was on the east side of Mount Shasta, there was a muffled "boom" that could be heard from the engine compartment immediately followed by a puff of white vapor. Thereafter, black smoke began to enter the cockpit consistent with an oil-burning smell. The pilot trimmed the airplane for the best glide speed (aim for the white arc) and the airplane began to descend rapidly at an estimated 1,000 feet per minute. While looking for a suitable place to make an off-airport landing, the pilot gave several position reports (between Mount Lassen and Lake Almanor) and declared an emergency. He observed a snowy field and began a stable approach, extending full flaps with the intention of slipping the airplane to the clearing. The pilot briefly attempted to troubleshoot the engine by turning the ignition switch to test the magnetos and manipulating the throttle. He noted that when he retarded the throttle there was a slight reduction in power, which gave him an indication that at least one piston continued to fire. He immediately advanced the throttle fully forward to arrest the descent as much as possible.

Zoë Keliher
Air Safety Investigator
Western Pacific Region

While aligning with the snow patch, he noticed a green meadow to the right (about 90°) and decided that would be a better option because there was no snow coverage. He was familiar with the area and had remembered seeing that meadow before. He retracted the flaps and made a right turn toward the meadow and turned the fuel selector to the right tank. He aimed the approach considering that he needed enough altitude to clear the treetops and planned to flare for the touchdown immediately after the fence that was oriented across the field. After he cleared the treetops, he extended the flaps again and continued toward the fence. He suddenly saw powerlines immediately ahead of the airplane. He attempted to maneuver the airplane in a dive underneath them and witnessed them passing over the windscreen.

The pilot stated that he thought the left wing contacted a utility pole. He was no longer in control of the airplane as it spun from the impact and the airplane came to rest inverted. At no point did he open the doors. The first responders had to use the jaws of life to extract him from the wreckage.

JAKE HICKOK (PJ HELICOPTERS, INC) [REDACTED]

At 1109 hours PJ Helicopters took a call from Tehama County Sheriff who notified us (generalized quote) “there was an airplane down in the Mineral area, do you have any aircraft unaccounted for? We don’t think it’s yours but wanted to make sure.” We did a quick check of our fixed wing and helicopters and confirmed we had nothing outstanding or in the area. We told them and said we would call back after a more thorough search. That was when I became aware of the incident. My intent at this point was to actively assist in identifying a better location and/or the aircraft involved to assist the public safety response with the tools I had at hand and relationship with local public safety, and to keep my manager informed. As the incident continued and location was confirmed, my role switched to a more passive intel gathering in the background while completing other tasks for work at my computer, and then eating lunch at my computer.

Shortly after the phone call, I started gathering intel, tuning into radio traffic from Tehama/Red Bluff CalFire, Tehama Sheriff, Redding CHP, and Lassen USFS. I also brought up ADSB tracking sites such as flightradar24, adsbexchange, and flightaware. I also had fire aircraft up on aff.gov tracking. I immediately noticed on AFF that CalFire Air Attack 230 (N408DF) was circling the Mineral area (I recall this to be around 1115-1120.) I believe he was in the air for the CalFire flight training occurring in Shasta County and diverted to the crash area for a recon flight. I also believe he was in contact with Redding CalFire during the recon as I don’t recall ever hearing radio traffic from him.

Historical tracking on flightradar24 between 1700 UTC and 1900 UTC showed N3089Z continuously circling the area, as well as N680CW making a few loops before continuing on. I made a mental note that either Oakland Center must have asked them to check the area, or they had heard a mayday or witnessed the incident. I also used flightaware to fill in the tracking gaps for those two tail numbers that flightradar wasn’t showing me. Flightaware showed me N3089Z was on a flight plan from Medford to Grass Valley, CA. N680CW was on a flight from Kansas to Redding, CA. Both of those paths put them near the crash site at that time.

At 1129 PJ Helicopters called Tehama Sheriff back after a thorough internal search confirming our earlier report. Sheriff dispatcher said they (general quote) “had made contact with the people involved” and confirmed it was not ours and thanked us for our time.

Radio traffic between 1109 and 1135 from the channels I mentioned earlier included a Tehama Sheriff deputy responding up Hwy 36 from Red Bluff, and something related to him (or another deputy) being (or getting) on a conference call with NTSB. Also Red Bluff CalFire had dispatched a standard aircraft down response for the area of Hwy 36 near Hwy 172 and Lassen Park. USFS Lassen dispatched their own resources separate from Red Bluff CalFire to the same area. Red Bluff CalFire Battalion Chief (I believe unit 2512, Gerry Magana) also asked dispatch if they could “contact Oakland Center and advise we (calfire) have confirmation of an aircraft down.”

Around 1135-1140 I hear USFS Lassen arrive at scene, either a battalion chief or an engine and declare themselves incident command over their USFS radio channel. Reported powerlines were down across Hwy 172 and plane was in a meadow. They’ll be making their way to the aircraft as engine was blocked by powerlines. Mineral fire volunteers made it on scene as well and reported over Red Bluff CalFire radio channel Hwy 172 was blocked and to have incoming resources take the longer route through Mineral “the back side of hwy172” to get resources closer to the aircraft. I think the Mineral volunteer stayed and hiked in, similar to the USFS resource.

At 1147 (noted time) I heard the USFS incident commander request with their dispatch in Susanville to (general quote) “launch a second medical helicopter for multiple victims possibly still alive”

At 1154 (noted time) I heard USFS incident commander update their dispatch with 2 serious patients, trying to get access to a third patient still trapped in the aircraft, possible 11-44 (fatality). My mental note recalled the first responders probably only had their medical bags with them and little to no extrication tools due to distance from vehicles blocked by powerlines.

From 1200 on, I paid less attention to the radio traffic and focused on other tasks at work and lunch. I noted continuous confusion between Tehama CalFire and USFS Lassen resources, since both were trying to take command of the scene. Mineral fire volunteers expressed anger over both Tehama CalFire radio and USFS Lassen radio about who they need to report to and give updates to and make resource requests. It did not hinder the response of fire rescue resources, but did contribute to duplicate resource requests and radio messages. USFS incident command maintained contact with his Susanville dispatch and maintained positive comms, with resource requests for air medical ships and confirming their ETA’s and callsigns. This area of Tehama County is a known area of mixed jurisdictions and response areas due to the ruralness of the area, limited radio system coverage etc. It is common for confusion and duplication of efforts between Red Bluff (sending Calfire) and Susanville (sending USFS Lassen, Chester fire and Chester Medics), as well as Redding vs Susanville CHP offices.

At about 1204 Red Bluff CalFire resources made it on scene past the downed powerlines, they reported a Cessna aircraft “upside down, on its hood” and then gave the tail number over the air to Red Bluff CalFire of N7302S. That was when I learned of the tail number, and searched for registration as well as tracking. I noted it belonged to Air Carriage out of Chico and passed that info on to a Director at PJ who I knew was close with various Chico aircraft businesses.

Finally between 1215 and by 1224 I had confirmation over the radio of a fatality and confirming if the Tehama County coroner was responding. I also noted shortly after the two medical helicopters had landed, and via radio they both confirmed taking the remaining two pax to Enloe Hospital.

Also between 1200-1230 I had looked up a few other intel sites such as CHP CAD website and noted Susanville CHP was taking primary on the call as well as a Traffic Hazard reported by Caltrans for road closure due to aircraft call Hwy 36 and Hwy 172. There was a line in their CAD system referencing the call as a mayday incident. You can get a transcript of their CAD through Susanville CHP. It appeared via their CAD that a Caltrans unit may have been one of the first public resources on scene as well.

That completes my general timeline of events and observations related to N7302S.

HENRY ROBINSON [REDACTED]

After removal of the engine the airplane sat about one month before they installed the new engine. He stated that he used F&M procedure to install the old oil filter adapter. When asked if he installed new gaskets he answered in the affirmative. He thought the vacuum seal was replaced because it was leaking.

OIL FILTER ADAPTER

TIM HENDERSON (AERO ACCESSORIES)

Mr. Henderson stated that the depth of the bore feature inside the oil pump housing that received the major diameter 'knob' at the end of the adapter spool is always in the same location (depth) relative to the gasket surface of the oil pump housing.

I checked with the machinist who makes the spools. He said we can just run the thread out (no undercut) or lengthen the thread and move the undercut further up, to gain even a greater 'margin or safety' with respect to the possibility of the gasket getting offset to the side by entering the undercut. This seems a minor change as it will have no effect on the installation procedure or performance of the part. I would like your concurrence (written) that you consider it a minor change so that we can incorporate it immediately, as we are about to begin a run of spools.

DENNIS WAITE (CORLEY GASKETS)

A representative from Corley stated that the company is not FAA certified, nor have they ever been in contact with an FAA inspector.

Corley Gaskets Sales to Aero Accessories:

2016	1600 ea.
2017	800 ea.
2018	1200 ea.
2019	1200 ea.

DON BYBEE (GPI GASKETS)

Mr. Bybee send invoices of the gaskets that he provided F&M, the last order was filled in 2013. He stated that the owner of F&M had used GPI to make the gaskets for the oil adapter. The owner would put in a request and GPI would contact Garlock to order a 60" x 60" sheet of material and cut as many gaskets as possible from that sheet. The FAA had come to their facility twice to make sure they were in compliance with the certification and tagging of the die. He stated that the die used to cut the gaskets with labeled FM07 in measured 2-1/4" OD x 1.745" ID and 1/16" thick. The last material used was the Garlock 3750 leak guard. He stated that F&M procured the following amount gaskets on these dates (the quantity is estimated based on the outer diameter of the gasket and size of sheet):

Date	Qty
1/14/2010	576
10/19/2011	576
8/17/2012	576
6/12/2013	576
7/19/2013	576

Mr. Bybee stated that that the material used for the gasket was multi swelling, which allowed oil to impregnate the material allowing it to swell. This is a common material used for a low-pressure seating situation, which he thought would be consistent with a <100psi system. The non-asbestos gasket material was primarily made of aramid (as well as rubbers and filler). Because of the materials high recovery (advertised as 52% by Garlock) if the gasket was not adequately torqued, the gasket material would swell/enlarge from oil saturation which could lead to a blowout (i.e. tear in gasket allowing oil to leak out). He stated that given the maximum pressure and temperature of the engines environment, the PxT rating for the gasket material seemed a good match because it was well under the advertised 350,000.

Mr. Bybee additionally stated that even if the gasket had received the proper amount of torque, there is considerable low loss that could occur from high temperatures in vibration after the initial installation. This is why it is essential to reapply/check torque after 10 hours of use.



Even though there were two AN900 copper filled gaskets torqued simultaneously the only one, it appears, that ever leaked was the one at the, accessory case to adapter, which is still where the adapter continues to have leaks even though both gaskets are subjected to the same 65 ft/lbs of torque and also torsional forces which act on both gaskets simultaneously due to the way they are tightened. To me that would mean something is going on after the initial torquing that only applies to the accessory case gasket which changing gasket types has not improved.

As we discussed where the gasket ID is made large enough to go over the threads and can keep the gasket from staying centered, which in turn could cause a mechanic to not be able to get a compressive stress across the complete width of the seating surface area on the non-asbestos gasket.

It appears mechanics have struggled with making sure the adapter does not move when replacing and re-tightening the filter and possibly also not been able to keep the gasket centered during installation. My concern would be that when installing new oil filters on the adapter the adapter appears to some times get rotated and the gasket between the adapter and accessory case are not replaced after this happens. Rather the accidental rotation is tightening or loosening it, either way, the gasket would be experiencing torsional stresses which it was not meant to endure once compressed.

If the Non-asbestos gasket has been in service and exposed to lubrication it surely decreases the gaskets tensile strength. Tensile stress decrease in ASTM testing is significant with Non-asbestos gaskets vs the old asbestos type gaskets. This is not a great problem when the gasket only sees compressive stress.

In a typical gasket installation if you were to loose some load on the gasket and retightened the bolts the gasket would only see additional compressive stress, not torsional stress along with that compressive stress.

I could see where if a mechanic was changing a filter and accidentally rotated the adapter and went back and retightened that adapter the torsional stress could act on the used gasket and could possibly cause it to split like you are seeing.

This is not even including the problem of the gasket possibly being off center like it appears you are seeing. This is where I spoke of many times you can have an application that may not be installed perfect and it still seals but if the gasket, which is meant to seal, has to deal with two problems together many times that is where you will see a possible catastrophic failure that is now been put in place to happen.

In your testing of scenarios I am thinking if you have access to a gasket that has been exposed to the oil in the engine, that is installed and then you have someone take off the filter and put the filter back on in a way that creates rotational forces on the adapter and then has to be retightened, especially if it is off center due to the centering problem, I believe you will possibly see the gasket split like you are seeing in the pictures of the failed gaskets. Of course length of time in use, engine temperatures and pressures would play a part in this also but all that may be hard to recreate.

If I were making this adapter I would want to convert the accessory case end of the adapter to an o-ring groove, put in an o-ring that can handle the temperature and oil product that is sealed. Since this would create a metal to metal contact entrapping the o-ring I would then go back to the "turn of nut" type tightening you saw where it was used in the copper clad gasket on the document you sent me.

Turn of nut type tightening is more precise than using a torque wrench. I imagine that is why it was used in the instructions you sent me on that copper clad gasket application.

I would also want a pin, screw or something which could be placed thru the adapter and accessory case flange face so that a mechanic replacing the filter would not have to worry about rotating the adapter when he is performing a simple procedure such as replacing a filter.

NICOLE CHARNON (TELEDYNE CONTINENTAL MOTORS)

Review of our internal coding manual (which only goes back to 2012) revealed that we had five events recorded with about one taking place every year or two. The last of which took place in June 2016; the NTSB IIC was made aware of the previous history.

The last time I worked one of these investigations, I forwarded a list of the known events to the NTSB IIC (Mr. Bob Gretz) [see attached message]. We also notified the ACO (Darby Mirocha). However, around that same time, the owner of F&M Enterprises (and the developer of the STC) passed away, and his brother was handling all inquiries. I am not sure when the STC was acquired by Tempest. Review of our internal coding manual (which only goes back to 2012) revealed that we had five events recorded with about one taking place every year or two. The last of which took place in June 2016; the NTSB IIC was made aware of the previous history.

Prior email:

Date: Thursday, September 25, 2014 3:34:00 PM

(Attachments: SE09356SC.pdf ICAWrevD.pdf Oil Filter Adapter Installation Instructions.pdf)

We have been involved with a couple investigations that involved improperly installed oil filter adapters (mostly the F & M Enterprises adapters, though there are some Cessna adapters that haven't been installed or inspected properly as well). Anyway, I have attached a photo from a closed accident case involving a twin Cessna that utilized the F & M Enterprises adapters (investigated by Leah Yeager; CEN13FA044). The photo shows two adapters (one from the left engine and one from the right). The left engine adapter used the proper components (a fiber gasket and a crush washer), while the right engine adapter had improper components (two crush washers, one of which was inadequately torqued). The one John looked at today also has two crush washers, which is incorrect, and the adapter was loose. The following are cases (that I am aware of) in which we found loose adapters:

- CEN13FA044
- ERA10LA335
- CEN09LA014
- WPR09LA422
- MIA08FA122 (not F&M adapter)
- There is one more...but I can't find it at the moment (I will let you know when I do).
- Josh Lindberg is also working another recent event involving N10EL, a Bonanza with a loose Cessna adapter (that is why I have included him and his FAA representative in this message).

I have attached the F & M Enterprises STC, the Installation Instructions, and Instructions for Continued Airworthiness.

Bob, the gentlemen that used to own F & M Enterprises and the guy we have dealt with on other accident investigations, passed away in June. His brother, James, is answering the phones there now and can help you with any additional information you might need. According to F & M Enterprises, every time they send out a gasket/washer replacement package, it includes the fiber gasket, the copper crush washer, and installation instructions. The system works when it is installed properly, as we have seen plenty installed the right way. Just so you know, as part of our 21.3 reporting requirements, we have notified our ACO of this event. If it is okay with you, we would like to send a copy of John's Engine Field Inspection Report to our ACO's Continued Operational Safety (COS) representative.

ERIK BEDILLION (FAA ATLANTA ACO)

Some further background on the STC (SE09356SC). The STC is issued to Stratus Tool Technologies, LLC (out of Newman, GA). The Atlanta ACO is the responsible office. It looks that the STC was reissued to Stratus in 2015. F&M Enterprises was the original STC holder.

Tempest Plus markets products manufactured by such companies as Aero Accessories, Inc., Aerospace Components, Inc., Alcor, Inc., Consolidated Fuel Systems, LLC, South Seas Venture, Inc., and Stratus Tool Technologies, LLC.

JAMES BROOKS (FAA ATLANTA ACO)

I have found 13 SDRs related to oil filter adapters, five of those can be identified as belonging to Cessna; which already has an AD on their adapters. For the purpose of our risk-assessment we will conservatively assume all of the remaining 8 adapters belong to F&M. I have attached a document

that has the original F&M ICA, Stratus ICA, Original Installation Instructions and Stratus Installation Instructions.

JOSE GIDEON (FAA ATLANTA ACO- CONTINUED OPERATIONAL SAFETY PROGRAM MANAGER)

Sent: Thursday, June 20, 2019 1:34 PM

I just wanted to give you an update regarding our continued operational safety activity associated with the oil filter adapter. Based on data available we have proposed the issuance of a FAA Flight Standards SAFO to alert operators of the issues related to the oil filter adapters. Our office is coordinating with Flight Standards to publish the SAFO as a short-term action to mitigate the potential unsafe condition posed by the condition exhibited in the accident aircraft and possibly the second accident that you are looking at today. We will address further corrective action based on the results of the NTSBs continuing investigation. Additionally, we are performing a risk analysis/assessment of the issue based on data that we are still gathering based on our MSAD process. Our analysis/assessment result will dictate whether we will require mandatory regulatory action to address this issue. Please let us know if you require anything from us or, any questions regarding any of the above. We look forward to the result of your activity today with the second reported accident. Have a great day.