



RECORD OF CONVERSATION

Michael J. Hodges
Air Safety Investigator
Central Regional Office
Office of Aviation Safety
National Transportation Safety Board

Date: 05/02/2022

**Person Contacted: Louie Bettis (FAA St. Louis FSDO – Principal
Maintenance Inspector)**

NTSB Case Number: CEN22LA128

Narrative:

The following is a synopsis of the information provided by Louie Bettis to the NTSB investigator-in-charge, via a telephone conversation:

- Louie traveled to Staunton, Illinois, to examine N5042K (Ryan L17B airplane equipped with a Continental Motors IO-520B engine) on March 28, 2022.
- The airframe serial number was confirmed as NAV-4-1654.
- The engine serial number was confirmed as 126406-8-C.
- The airplane sustained substantial damage to both wings from the accident sequence.
- Flight control continuity was established for the airframe.
- There appeared to be adequate fuel onboard the main fuel tanks and the auxiliary fuel tank.
- There were no signs of a fuel leak with the airframe.
- The airframe fuel lines were found intact.
- The fuel selector was able to be rotated by hand through the various detents with no issues noted.
- Airframe to engine control continuity was established.
- All the engine fluid lines and fittings were found to be properly secured.
- There were no signs of a fuel leak with the engine.
- The fuel manifold valve assembly and primer lines going to the engine fuel nozzle assemblies (6 total) were examined, with no issues noted.
- Fuel was observed in the fuel injection system.
- The fuel injection system nozzles were all removed and examined. All nozzles were clear of debris.
- The spark plugs were removed, the spark plugs had a normal appearance, and no issues were noted. The spark plugs were later sparked tested, and all the spark plugs performed normally.
- The propeller was able to be fully rotated by hand, confirming internal engine continuity.
- The propeller was examined, and no issues were noted.
- During the examination, there were no mechanical anomalies noted with the airframe and the engine.

- The following fuel injection system components were retained for further testing and examination work: the control valve assembly, the fuel manifold valve assembly, and the fuel pump.
 - The airframe, engine, and propeller maintenance records were reviewed.
- **** Nothing Follows ****

AIRCRAFT ACCESSORIES OF OKLAHOMA INC,
REPAIR STATION # RV3R829L



OF OKLAHOMA
AIRCRAFT ACCESSORIES EVALUATION FORM

Customer: Michael Hodges

Date: 5 / 11 / 22

Phone: [REDACTED]

E-mail: [REDACTED]

Part Number: 649052A1-1 Serial Number: TCM SYSTEM

Ref Number: N5042K

Summary of evaluation: We tested the system first problem found fuel pressure was low psi 4.5 should be 9 to 11
pump part number 646212-2 S/N M3989. second problem found throttle metering unit was leaking through the screw to the
metering insert was leaking fuel throttle control p/n 629904-2 s/n I237605A Problem number three. fuel flow wandering
would not stay set . so right away we know we have contamination in the unit. so we disassembled the throttle control unit
the shafts had damage . and the metering valve had damage. problem number four flow divider leaking fuel in to the air side
of the diaphragm. p/n 631427-1 s/n m1629 problem number five fuel pump contamination disassembled pump found
trash on the pressure seat it also had damage on the seat we did not remove the rubber from the seat left in place

Cost of Repair: \$ Overhaul Cost: \$ Exchange Cost: \$

Technician: ken shadden Phone: [REDACTED] E-Mail: [REDACTED]

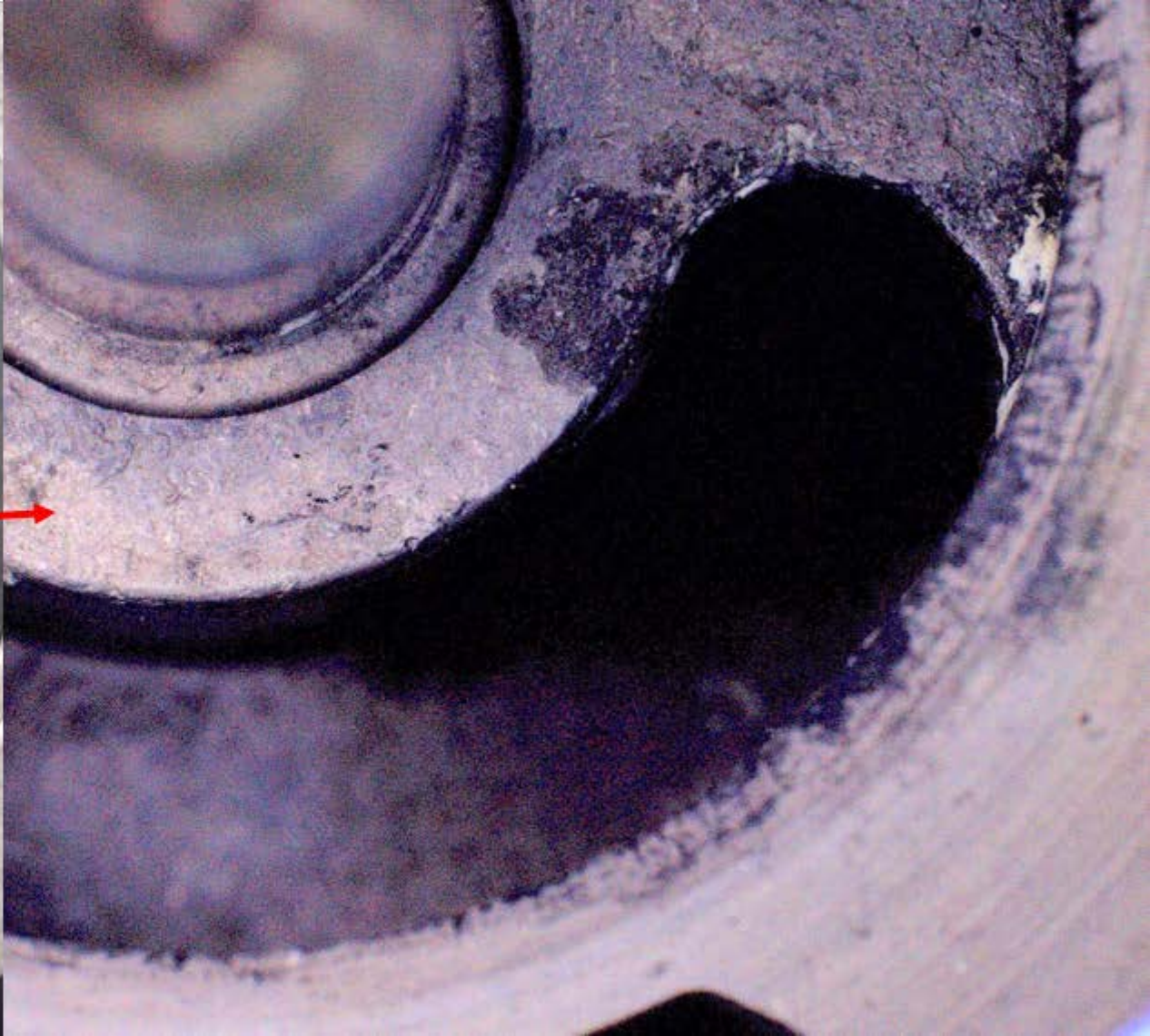
From: [REDACTED]
To: [REDACTED]
Cc: [REDACTED]
Subject: CENZ2DA126-Deposit on fuel pump interior (corrected)
Date: Monday, August 1, 2022 1:36:37 PM
Attachments: [image001.png](#)
[image003.png](#)

Mike,

The fuel pump from this accident was submitted to the Materials Laboratory for examination. On the interior of the fuel pump, a dark deposit was found during the teardown as shown in the attached photograph. The deposit was firmly adhered to the surface of the pump and could not be removed for further examination. When viewed under magnification, the deposit's appearance was consistent with corrosion/oxidation of the surface material. If you have any questions, please let me know.

Nancy B McAtee
Senior Chemist
RE-30

The dark deposit was firmly attached to the surface of the pump.



SERVICE BULLETIN

Contains Important Information Pertaining to Your Aircraft Engine
Compliance Will Enhance Safety

SB08-4A

Supersedes SB08-4
TECHNICAL PORTIONS
FAA APPROVED

SUBJECT: FUEL INJECTION SYSTEM CONTAMINATION

PURPOSE: To provide guidelines to prevent contamination of Continental Motors (CM) fuel injection systems during installation and maintenance.

COMPLIANCE: Anytime a CM continuous flow fuel injection system component is removed for replacement or repair.

MODELS

AFFECTED: All with CM Continuous Flow Fuel Injection Systems

Continental Motors has continued to receive fuel injection system components from the field which have been contaminated with foreign material during installation or maintenance procedures. It is imperative that fuel injection system components be kept free from contamination during all installation and maintenance procedures. The following guidelines must be followed during fuel injection system maintenance:

- All caution must be exercised during reassembly of the fuel system to NOT allow any contaminants to enter the components, lines and fittings during installation.
- All surfaces surrounding the area where components are to be installed must be clean and free of all forms of contaminant before and during installation.
- All hose assemblies must be flushed and verified to be free of contamination prior to installation.
- All fuel system component and lines must be capped and remain capped until flushed and ready for installation.
- The engine, tools and environment must be clean to minimize any potential for fuel system contamination.
- All fuel system components, regardless of their source, must be purged at time of installation.

WARNING

Fuel system contamination may lead to fuel system component damage, erratic engine operation, loss of power, or engine shutdown.

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FUEL SYSTEM PURGING PROCEDURES

1. Fuel Pump Installation

- a. Install fuel pump using the latest revision of the applicable engine Maintenance and Overhaul Manual.
- b. Remove the protective cap from the fuel inlet line. Direct the fuel inlet line into a clean bucket. Utilizing the airframe boost pump, flush a minimum of 1 quart of fuel from the fuel pump inlet hose into a clean, dry container.
- c. Inspect the flushed fuel. If free from contamination, proceed to the next step. If contamination is found, locate the source and correct the issue before proceeding further.
- d. Remove the fuel pump inlet fitting cap and install the inlet fuel line using the installation instructions contained in the latest revision of the applicable engine Maintenance and Overhaul Manual.
- e. Remove the cap from the fuel outlet line and install the line using the applicable engine Maintenance and Overhaul Manual. (If line is installed or partially installed, the line will have to be removed to facilitate the flush process.)
- f. Utilizing the airframe boost pump, flush a minimum of 1 quart of fuel through the fuel pump into a clean, dry container. If the fuel pump is equipped with a mixture control, operate the mixture control slowly through its full range of motion several times during the flushing procedure.
- g. Inspect the flushed fuel. If free from contamination, proceed to the next step. If contamination is found, locate the source and correct the issue before proceeding further.
- h. If the fuel pump and associated lines are verified to be free from contamination, complete the fuel pump installation and setup procedures in accordance with the latest revision of the applicable Maintenance and Overhaul Manual, and the latest revision of M-0, Standard Practice Maintenance Manual.

2. Fuel Control Unit

- a. Install the fuel control unit using the latest revision of the applicable engine Maintenance and Overhaul Manual.
- b. Remove the protective cap from the fuel control inlet line. Direct the fuel control inlet line into a clean bucket. Utilizing the airframe boost pump, flush a minimum of 1 quart of fuel from the fuel control inlet hose into a clean, dry container.
- c. Inspect the flushed fuel. If free from contamination, proceed to the next step. If contamination is found, locate the source and correct the issue before proceeding further.
- d. Remove the cap from the fuel control inlet line and install the line using the applicable engine Maintenance and Overhaul Manual.
- e. Remove the cap from the fuel control outlet. Install the fuel control outlet line using the applicable engine Maintenance and Overhaul Manual. (If line is installed or partially installed, the line will have to be removed to facilitate the flush process.)

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- f. Utilizing the airframe boost pump, flush a minimum of 1 quart of fuel from the fuel control inlet hose into a clean, dry container. If the fuel control is equipped with a mixture control, operate the mixture control slowly through its full range of motion several times during the flushing procedure.
- g. Inspect the flushed fuel. If free from contamination, proceed to the next step. If contamination is found, locate the source and correct the issue before proceeding further.
- h. If the fuel control unit and associated lines are verified to be free from contamination, complete the fuel control unit installation, additional fuel system component installation if required, and setup procedures in accordance with the latest revision of the applicable Maintenance and Overhaul Manual, and the latest revision of M-0, Standard Practice Maintenance Manual.

3. Fuel Manifold Valve

- a. Install the fuel manifold valve using the latest revision of the applicable engine Maintenance and Overhaul Manual.
- b. Remove the protective cap from the fuel manifold valve inlet line. Direct the fuel manifold valve inlet line into a clean bucket. Utilizing the airframe boost pump, flush a minimum of 1 quart of fuel from the fuel control inlet hose into a clean, dry container.
- c. Inspect the flushed fuel. If free from contamination, proceed to the next step. If contamination is found, locate the source and correct the issue before proceeding further.
- d. Remove the cap from the fuel manifold valve inlet and install the line using the applicable engine Maintenance and Overhaul Manual.
- e. Install the fuel injector lines. Torque each fitting at the manifold valve to 55-60 in-lbs.
- f. Utilizing the airframe boost pump, flush fuel from the fuel injector lines into appropriate, clean, and dry containers.
- g. Inspect the flushed fuel. If free from contamination, proceed to the next step. If contamination is found, locate the source and correct the issue before proceeding further.
- h. If the fuel manifold valve and associated lines are verified to be free from contamination, complete the fuel manifold valve installation, additional fuel system component installation if required, and setup procedures in accordance with the latest revision of the applicable Maintenance and Overhaul Manual, and the latest revision of M-0, Standard Practice Maintenance Manual.

4. Bypass Fuel Filter (Where Installed)

- a. Install the bypass fuel filter assembly using the latest revision of the applicable engine Maintenance and Overhaul Manual
- b. Remove the protective cap from the bypass fuel filter inlet line. Direct the fuel inlet line into a clean bucket. Utilizing the airframe boost pump, flush a minimum of 1 quart of fuel from the bypass fuel filter inlet hose into a clean, dry container
- c. Inspect the flushed fuel. If free from contamination, proceed to the next step. If contamination is found, locate the source and correct the issue before proceeding further.

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- d. Remove the cap from the bypass fuel filter inlet line and install the line using the applicable engine Maintenance and Overhaul Manual.
- e. Utilizing the airframe boost pump, flush a minimum of 1 quart of fuel from the bypass fuel filter inlet hose into a clean, dry container.
- f. Inspect the flushed fuel. If free from contamination, proceed to the next step. If contamination is found, locate the source and correct the issue before proceeding further.
- g. If the bypass fuel filter and associated lines are verified to be free from contamination, complete the bypass fuel filter installation, additional fuel system component installation if required, and setup procedures in accordance with the latest revision of the applicable Maintenance and Overhaul Manual, and the latest revision of M-0, Standard Practice Maintenance Manual.

NOTE: Operational verification of the engine fuel system in accordance with the latest revision of M-0, Standard Practice Maintenance Manual is required any time one of the following circumstances occurs: (1) at engine installation, (2) during 100 hour and annual inspections, (3) whenever a fuel system component is replaced or adjusted, (4) when changes occur in the operating environment.

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