

# LESSON LEARN FLYING SCHOOL ACCIDENT INVESTIGATION MAINTENANCE



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# Investigation Finding

- The maintenance process was not fully managed (uncontrolled, maintained by third party without any control)
- Insufficient quality system (oversight, not sufficient system and personnel)
- Repetitive trouble



# Investigation Finding

- Engine detonation
- Fuel mix management
- Lag of maintenance knowledge in specific component or equipment (Garmin 1000 operational tracking system)



# Maintenance Influence

- Since 2011, there were 28 cases of Flying School occurrence,
- There were 5 occurrences in 2016, and two cases in one month (August 2016).
- In total since 2011 – 2016 there were 28 % contributed by maintenance influence and dominated by Engine and Powerplant



# Flight Training Maintenance Cases Overview

- Maintenance Management and Quality System
- Engine System – Bp. Suleman
- Fuel Mix Management
- Lag of Maintenance Knowledge



# Maintenance Management and Quality System

- Most of Flying school was equipped with maintenance management and facility but only few who had a maintenance control system (***e.g. maintenance historical control, monitoring repetitive trouble***)
- Lag quality surveillance induced the quality of aircraft maintenance (***e.g. some flying school had quality system but loss their control to maintenance***)





# Fuel Fix Management

- Understanding of Supplement Type Certificate (STC) for using the mix Avgas (Low Leaded Fuel - 100 LL) and Unleaded Automotive Fuel .
- Mostly used the STC No SE2587CE – be careful with the applicability

United States of America  
Department of Transportation -- Federal Aviation Administration  
*Supplemental Type Certificate*

*Number* SE2587CE

*This certificate issued to* Petersen Aviation, Inc.  
984 K Road  
Minden, NE 68959

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of CAR 3 of the Regulations.*

*Original Product Type Certificate Number :* E-274

*Make:* Lycoming

*Model:* O-320-B1A, -B1B, -B2A, -B2B, -B2C, -B2D, -B3A, -B3B, -B3C, -D1A, -D1B, -D1C, -D1D, -D1E, -D1F, -D2A, -D2B, -D2C, -D2D, -D2E, -D2F, -D2G, -D2H, -D2J, -D3G. O-320-A, C and E Series Models with an FAA Approved conversion not exceeding 160 hp, not exceeding a compression ratio of 8.5:1, and listed on Supplemental Type Certificate SE1931CE are also eligible. This STC is not approved for any O-320 H Series engine or any O-320 Series engine exceeding 160 hp and 8.5:1 compression ratio.



# Fuel Fix Management

- Laboratory result in four flying school showed the AKI (Anti Knock Index) is within the limit but how to store and serve to the aircraft in service is unknown which affected to the octane number degradation.



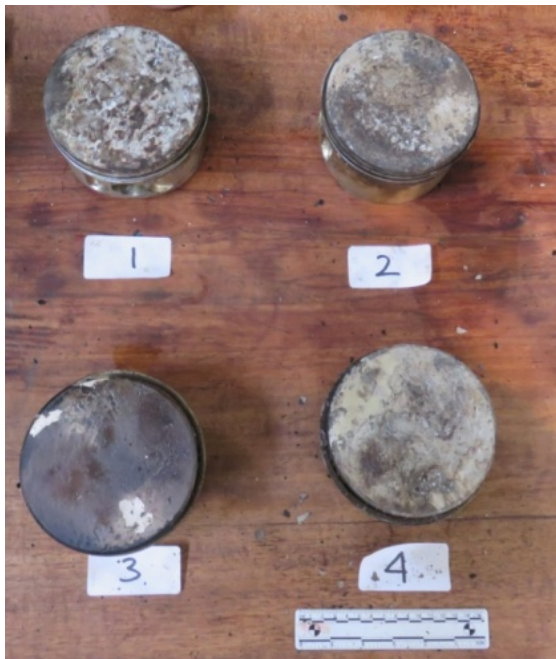
Container capacity 200 lt (0.8 × 0.5 m).  
Water in the container 0.02 m  
Water in the tank approximately:  
 $2 \times 3.14 \times 0.25^2 \times 0.02 = 0.00785 \text{ m}^3$   
or ± 8 lt or 4% in 1 container

**Remember - Use of fuel with lower octane numbers may lead to the problem of engine knocking**



# Lag of Maintenance Knowledge

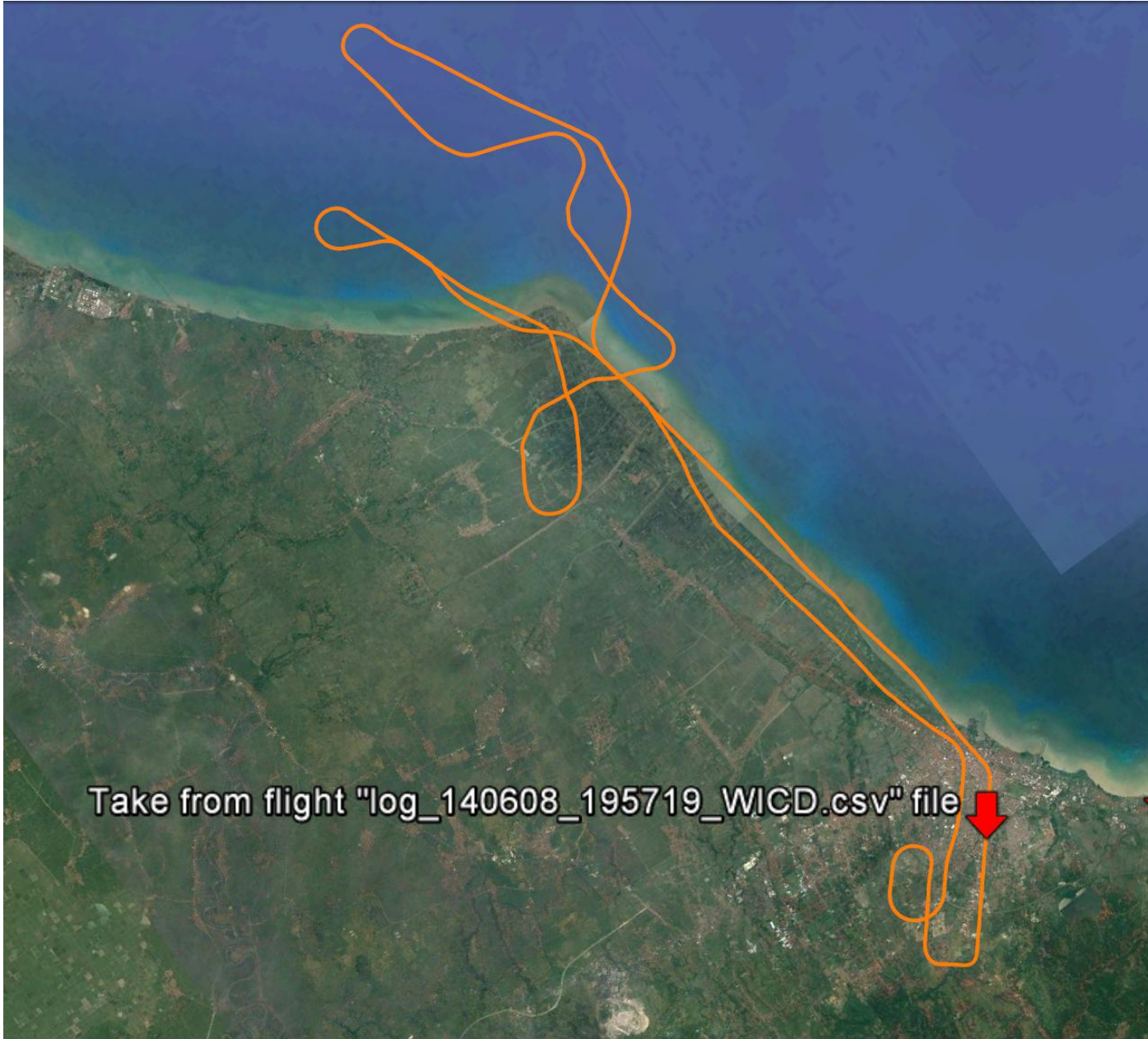
- Repetitive engine problem is not easily solved by the maintenance personnel since there were no flight crew report





# Lag of Maintenance Knowledge

- KNKT observe one of the flying school using the modern glass cockpit system but unfortunately the system is not optimally utilized.
- e.g. Garmin 1000 had the capability similar with FDR. The system had 60 parameter which cover:
  - Flight attitude – can be used as FDA
  - Engine Parameter – can be used as Engine Trend monitoring



Take from flight "log\_140608\_195719\_WICD.csv" file



# THANK YOU

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