

Air Safety Investigation →

Revision 11/25/2015

Single Engine Final Report 1/8/18

Accident Date:	12/11/16
Aircraft Registration:	YS-332PE
Aircraft Manufacturer:	Piper 1977
Location:	Ingenio La Cabana, SV
On Scene Exam:	No
NTSB IIC:	Dan Baker

Accident Time (24 hr.): 13:07 UTC Air Safety Investigator: David Harsanyi, ASI Aircraft Model: PA-38-112 Aircraft S/N: 38-78A0663 Aircraft Damage: Destroyed NTSB Report# CEN17WA222

Engine:	Engine Information
	Experimental Engine 🗌 Yes 🖾 No
Model Number:	O-235-L2C
Serial Number:	L-15468-15
Total Time:	161.5 Hours Since Field O/H
Crankshaft S/N:	
Case Match #:	2832

Propeller:	Manufacturer	Part Number	Serial Number
Rotorcraft	Unk	Unk	Unk

Injuries:	Number	Fatal	Serious	Minor	None
Crew:	2	2	0	0	0
Passengers:	0	0	0	0	0
Ground:	0	0	0	0	0

Registered Owner:	Centro de Adiestramiento Aereo Avanzado (CAAA)	Operator:	Centro de A Avanzado (C	diestramiento Aereo AAA)
Pilot:	Unk	Medical: Undetermine	d	Date Issued: Unk
Certificates and Ratin	ngs: 1:	2:		3:

Summary:

As reported in the ICAO accident notification report from the Centre de Adiestramiento Aereo Avanzado (CAAA). Aircraft registered as YS-332PE took off from MSSS on Dec 11th, 2016 at 06:40am local time with two people on board, one female flight instructor and one male pilot student along with 3 hours of fuel. Purpose of flight was instructional, headed to "Sector 4" (Ingenio La Cabana, Rwy code MSCB). At 07:07 am local time, Ilopango tower (MSSS) ATC lost communications with YS-332PE. At 07:30 am local time, a commercial aircraft flying at 30,000ft above the accident site reported an active ELT signal. Accident aircraft was found at 09:00 am local time by another aircraft from the same flight school as YS-332PE.

Enroute Flight Data

Flight Planning

Type of Flight: Training	Scheduled?	🗌 Yes 🗌 No	N/A	Rented Airc	raft? 🛛 Yes 🗌 No 🖾 Unk
Purpose of Flight: Instructional				Lease Back	? 🗌 Yes 🗌 No 🖾 Unk
Departure Point: MSSS					
Destination: MSCB					
Flight Plan Filed? Undt			Flight	Plan Type: V	′FR
Flight Plan Activated? Yes No	Unknown	Closed?] Yes 🗌 I	No 🖾 Unknown	
Last Radio Communications To: Ilop	angoTower (N	ISSS)			Time: 13:07
Nature of Transmission: 🗌 Routine	e 🗌 Emerge	ency			

Remarks:

Limited Flight information provided with this foreign engine examination.

Weather

Nearest Weather Reporting Station								
Location: San Salvad	Identifier: MSSS							
Time: 13:50 UTC	009 Knots							
Visibility: Present Weather:								
Sky Condition:	Sky Condition:							
Temperature:	Dev	v Point:		Altimeter Setti	ng:			
Weather Reporting Station Elevation: Feet								
Distance From Accide	ent Site:		Direction To Accid	ent Site:				

Remarks:

Limited historical Weather information available for location provided.

Fueling

Last Known Fueling Location: Unk						
Fuel on Board at Departure: Gallons Actual Estimated Unknown						
Fuel Added Prior to Departure? Yes Amount: No Unknown						
Type of Fuel: Undetermined	Was Fuel Found at Site? 🗌 Yes Color: 🗌 No					
Automotive Fuel STC? Yes No	STC No.					

Remarks:

No fueling information supplied with this foreign engine examination.

Mishap Site Data

Location:	Address:						
Elevation:	Latitude: N ° ' Longitude: W '						
Impact Path Magnetic Heading: °							
Terrain Level Ro Features: Desert Wate	Terrain Level Rolling Mountainous Wooded Plowed Field Crops Brush Swamp Features: Desert Water City Area Other (specify)						
Conditions of Terrain: 🗌 Ha	ard 🗌 Dry 🗌 S	Soft 🗌 \	Wet Snow Cove	red 🗌 Other (specify)			
Light Conditions: Day	Night Remar	s:					
Obstacles Struck Before Principal Impact: Wires Trees Brush Building None							
Approximate Attitude at Impact: Unknown							
Pitch:		Roll:		Yaw:			

Remarks:

No accident mishap data or information supplied with this foreign engine examination.

Pilot Data

Pilot in Command

Seat:	Name:			Injury:					
Address:		Certificate N	0.:						
					Date of Birth	:			
Medical: Class	S:	Date:			Autopsy:	-	Toxicol	ogy:	
Medical Limitat	ions:								
Certificates and	d Ratings: 1:		2	:		3:			
Last Flight Rev	iew:	Additional C	Certificates, or	Ratings (inclue	ding Type Rat	tings) no	ot listed	above:	
			Flight	Time					
		This Make	Single			Act	tual		
	All Aircraft	and Model	Engine	Multi-Engine	Night	Instru	ument	Other	
Total Time									
PIC									
Dual									
Last 30 Days	ast 30 Days								
Source of Infor	mation: 🗌 Lo	gbook 🗌 FA	AA 🗌 NTSB	Other					

Remarks:

One Female flight instructor and one male student pilot, no further pilot or student pilot information provided with this foreign engine examination.

2 nd Pilot N/A									
Seat:	Name:					Injury:			
Address:						Certificate N	lo.:		
						Date of Birth	า:		
Medical: Clas	s:		Date:			Autopsy:		Toxicol	ogy:
Medical Limita	tions:								
Certificates an	d Ratings: 1	:		2	-		3:		
Last Flight Rev	/iew:	Ade	ditional C	Certificates, or	Ratings (inclue	ding Type Ra	tings) r	not listed	above:
				Flight	Time				
		This	s Make	Single			A	ctual	
	All Aircraft	and	Model	Engine	Multi-Engine	Night	Inst	rument	Other
Total Time									
PIC									
Dual									
Last 30 Days									
Source of Info	rmation: 🗌 I	_ogboo	k 🗌 F/	AA 🗌 NTSB	Other				

Remarks:

One Female flight instructor and one male student pilot, no further pilot or student information provided with this foreign engine examination.

Passenger Information

Seat	Name and Address	Injury	Age
Seat	Name and Address	Injury	Age
Seat	Name and Address	Injury	Age
Seat	Name and Address	Injury	Age
Seat	Name and Address	Injury	Age
Seat	Name and Address	Injury	Age
Seat	Name and Address	Injury	Age

Remarks:

No passenger information supplied with this foreign engine examination.

Ground Injuries

Name and Address	Injury	Age
Name and Address	Injury	Age
Name and Address	Injury	Age
Name and Address	Injury	Age
Name and Address	Injury	Age
Name and Address	Injury	Age
Name and Address	Injury	Age

Remarks:

No ground injuries reported with this foreign engine examination.

Engine Instruments and Controls

Legend: D – Destroyed B – Broken N – No Damage

N – No Damage Unk – Unknown F – Fire Damage I – Impact Damage S – Separated N/L – Not Located OSL – Off Scale Left OSR – Off Scale Right E - Electronic/ Digital N/O – Not Obtainable N/A – Not Applicable SR – See Remarks

Engine Instruments All Destroyed		Engine Controls (Cockpit) All Destroyed		
Hourmeter	Unk	Throttle	Unk	
Tachometer - RPM	Unk	Mixture Control	Unk	
Tachometer - Hours	Unk	Propeller Control	Unk	
Cylinder Head Temp	Unk	Carburetor Heat	Undetermined	
Oil Pressure	Unk	Alternate Air	Undetermined	
Fuel Pressure	Unk	Fuel Management All Destroyed		
Exhaust Gas Temperature	Unk	Selector Handle Undeterm		
Turbine Inlet Temperature	Unk	Selector Valve Undeterm		
Ammeter	Unk	Firewall Fuel Shutoff Undeter		
Voltmeter	Unk	L Main Tank Quantity Unk		
Vacuum Pressure	Unk	L Aux Tank Quantity Unk		
Fuel Flow	Unk	R Main Tank Quantity Unk		
Primer Locked?	Undetermined	R Aux Tank Quantity	Unk	

Electrical Switch Positions 🗌 All Destroyed					
Master Battery: Undt	Master Alternator: Undt	Avionics 1: Undt			
Stand-By Battery: Undt	Alternator 2: Undt Avionics 2: Undt				
Fuel Boost Pump: Undt	Ignition Switch: Undetermined				
Navigation Lights: Undt	Rotating Beacon(s): Undt	Landing Light(s): Undt			
Taxi Light(s): Undt	Strobe Light(s): Undt	Instrument Lights: Undt			

Remarks:

No information or pictures were shared with the Lycoming Air Safety Investigator concerning the instrument panel and/or engine control positions from the accident.

Model Serial Number		lumber		Total Time	
0-235-L2C		L-154	L-15468-15		161.5 Hours Since Field O/H
Above engine Information	: 🛛 Dataplate 🗌	Maintenar	nce Rec	ords 🗌 Other	
Dataplate Attached/Found? Xes No Exp		Experimer	ntal Eng	ine? 🗌 Yes 🖾 No	
Case Match # 2832	Engine S/	N on Case: L-16296-15		Cranks	shaft S/N: Undertermined

Maintenance Records Attached?	🛛 Yes 🗌 No	On-Scene Exam?	🗌 Yes 🛛 No
Post Recovery Exam?	🛛 Yes 🗌 No	Propeller Attached?	🗌 Yes 🖾 No
Engine Disturbed Prior to Your Arrival?	🛛 Yes 🗌 No	Engine Appear to be runable?	🗌 Yes 🛛 No
Does Crankshaft Rotate?	🖾 Yes 🗌 No	Evidence of pre-impact fire?	🗌 Yes 🖾 No
Does Clankshalt Rotate:		Evidence of pre-impact me	

Last Annual Inspection by:	Unk	Date: Unk
Last Overhaul by:	J&E Aircraft CO. Miami, FL	Date: 4-21-16

Remarks:



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Propeller 🗌 Rotorcraft							
Manufacturer	Part Number	Serial Number					
Unk	Unk	Unk					
Propeller Type: 🗌 Metal 🗌 Wood 🗌 Composite 🖾 Unknown							
Propeller Blade Serial Numbers:	Blade 1	Blade 2					
	Blade 3	Blade 4					

Propeller Governor Rotorcraft N/A

Manufacturer	Part Number		Serial Number
Governor Control Position:	Gasket Screen Condition		
Governor Oil Line:	Properly Secured?	🗌 Yes 🗌 I	No 🗌 Unknown 🗌 N/A
	Correct Line Nuts?	🗌 Yes 🗌 I	No 🗌 Unknown 🗌 N/A
	Correct Fittings?	🗌 Yes 🗌 I	No 🗌 Unknown 🗌 N/A

Propeller Remarks:

Propeller removed prior to engine being shipped for engine examination, no further propeller information provided as part of this exam.

Fuel System		-1			
Manufacturer: Marvel Schebler Model: MA-3PA Setting: 10-5267					
Serial. No: MSC	14405 Floats:	_ Meta	al 🗌 Composite	🛛 Plastic 🗌 N/A	
Fuel Screens	Carburetor/Injector Inlet:				
	Aircraft Main Fuel Strainer:	Clean	Contaminated	Destroyed 🛛 Unknown	
_					
Control Position	ns				
Throttle: Unk			Carburetor Heat: l	Jnk	
Mixture Control:	Unk		Alternate Air: Unk		
Flow Divider	N/A Destroyed				
Manufacturer:		Part N	lo:	Serial No:	
Evidence of Fue	l Found? 🛛 Yes 🗌 No 🛛 Con	ntamina	ation Observed?		
Diaphragm Cond	lition?	sed 🗌	Destroyed 🗌 Unkı	nown 🔲 See Remarks	
Injector Nozzl	es 🛛 N/A 🗌 Destroyed				
GAMIjectors Yes No Unknown Type: Condition:					
Lines secure: Yes No Compromised Destroyed Unknown See Remarks					
Fuel Pump 🔲 N/A 🗌 Destroyed					
🗌 Diaphragm 🔲 Geared 🔲 Electric 🔲 Gravity Fed 🛛 See Remarks 🖾 Unknown					
Manufacturer: U	Ink Part No.: Un	k		Serial # / Date Code: Unk	

Fuel System Remarks:

Carburetor arrived separated from the engine and showed signs of impact damage at time of the engine exam. Upon disassembly, the plastic floats remained intact inside the float bowl with no noted damage or cracks to the floats. Fuel inlet screen was clean and unobstructed upon inspection. Mating flange showed signs of impact damage on two of the four corners around bolt holes. No fuel was present in the float bowl as the drain plug had been removed prior to the engine arriving for exam.

Fuel pump was not present or sent with the engine for the exam.



Magnetos:

Left Dual Magneto Electronic Destroyed					
Model: 4381	P/N:	S/N: 16010846			
Functionir	ng? 🖾 Yes 🗌 No 🛛	Unknown			
esults:					
known Sp	arks at all leads 🛛 Ye	es 🗌 No 🔲 Unknown			
Damage: Attach flange impact damaged					
	ectronic Destroyed Model: 4381 Functionir esults: known Sp jed	ectronic Destroyed Model: 4381 P/N: Functioning? Yes No esults: known Sparks at all leads Ye ed			

Right Magneto Electronic Destroyed					
Manufacturer:: Slick	Model: 43	381	P/N:	S/N: 16021580	
Impulse Coupling? X Yes No		Functioning? Xes No Unknown			
Timing Checked? 🗌 Yes 🖾 No 🛛 R	lesults:				
Drive Secure? 🗌 Yes 🛛 No 🗌 Un	Spark	is at all leads 🗌 Yes 🗌 I	No 🗌 Unknown		
Damage: Attach flange impact damged					

Magneto Remarks:

Both magnetos were sent with the engine for exam, but had been previously removed. Attach flange cracked on each magneto, both magnetos produced spark when rotated externally at each lead. No further testing completed on these components.



Spark Plu	gs			
Manufactur	er: Champion	Type: REM37BY		SI 1042 Approved? 🛛 Yes 🗌 No
	Spark Plug Con	dition (per Champio	n Aviation Ch	neck-A-Plug Card AV-27)
1 Тор	Undamaged Electrode/	Normal	1 Bottom	Worn Out/Normal
2 Тор	Carbon Fouled		2 Bottom	Oil Fouled
3 Тор	Worn Out/Normal		3 Bottom	Worn Out/Normal
4 Тор	Worn Out/Normal		4 Bottom	Worn Out/Normal
5 Тор			5 Bottom	
6 Тор			6 Bottom	
7 Тор			7 Bottom	
8 Тор			8 Bottom	

Spark Plug Remarks:

All spark plugs exhibited signs of rust on the ground electrode end and face. Bottom plugs showed signs of being oil soaked with engine oil, common with transportation and storage of an engine.



Ignition I	Harness			
Tested:	🗌 Yes	🛛 No	Condition:	

Remarks:

Neither ignition harness were tested as part of this engine exam. One harness was received installed to magneto but with ends cut, the other harness was not received with engine. No further testing of this component.

En	aine	Data
	3	

Starter:

Manufacturer: Kelly Aerospace	Destroyed Unknown N/A			
Part No: MZ-4204R	Serial No.: K060845			

Remarks:

Engine arrived with starter removed. Starter housing showed signs of rotational scoring, typically seen from starter ring gear contacting housing at time of ground impact.



Alternator:

Manufacturer: Kelly Aerospace	Destroyed 🗌 Unknown 🗌 N/A
Part No: ALY-6521R	Serial No.: K060143

Remarks:

Housing of alternator fragmented with broken attachment points, likely due to impact damage. Alternator not attached to engine at time of engine exam. No further testing of this component.



Generator:	
Manufacturer:	🗌 Destroyed 🗌 Unknown 🛛 N/A
Part No:	Serial No.:

Remarks:

Vacuum Pump:		
Manufacturer:	🗌 Destroyed 🛛 Unknown 🗌 N/A	
Part No:	Serial No.:	

Remarks:

Vacuum pump not attached or sent with engine for the exam. No further information provided to Lycoming regarding this component.

🗌 Stand-by Pump or 🔲 Aux. Pump:		
Manufacturer:	🗌 Destroyed 🗌 Unknown 🛛 N/A	
Part No:	Serial No.:	

Remarks:

Lubrication System:

Oil Suction Screen: See Below	Oil Pressure Screen: N/A			
Oil Filter: See Below	Oil Cooler Integrity: Undetermined			
Oil Cooler Hoses: Undetermined				

Oil System Remarks:

Oil suction screen was not present within the engine at time of exam. Oil filter was not found or sent with engine per the El Salvador Civil Aviation Authority Investigator.

Oil cooler and oil cooler hoses not examined as part of this engine exam.

Page Not Applicable on this engine model.

Single or Left Oth	er than Lycoming Insta	alled System	Lycoming Installed System
Manufacturer:		Destroyed	Unknown 🗌 N/A
Part No:		Serial No:	
Rotate? 🗌 Yes 🗌 No 🗌 Unk	Foreign Object Ingestic	n? 🗌 Yes 🗌 N	lo 🗌 Unknown 🔲 See Remarks
Damage:			

Right Othe	er than Lycoming Insta	Iled System 🗌 Lycoming Installed System
Manufacturer:		Destroyed Unknown N/A
Part No:		Serial No:
Rotate? Yes No Unk	Foreign Object Ingestic	on? 🗌 Yes 🔲 No 📋 Unknown 📋 See Remarks
Damage:		

Density Controller Manufacturer: Destroyed Unknown N/A Part No: Serial No.:

Differential Control

Manufacturer:	Destroyed Unknown N/A
Part No:	Serial No.:

Variable Absolute Controller

Manufacturer:	Destroyed Unknown N/A
Part No:	Serial No.:

Slope Controller

Manufacturer:	Destroyed Unknown N/A
Part No:	Serial No.:

Manifold Pressure Relief Valve

Manufacturer:	Destroyed Unknown N/A
Part No:	Serial No.:

Exhaust Bypass Valve Manufacturer: Destroyed Unknown N/A Part No: Serial No.:

Turbo System Remarks:

Engine Observations

Numerous components were removed from the engine before it arrived for the exam, those components are as follows:

Magnetos Starter Carburetor Alternator Ignition harness

Components not retuned with engine for examination are as follows:

Oil filter Vacuum pump Fuel pump Ignition harness (qty 1) Oil suction screen

Internal engine timing between crankshaft and camshaft was confirmed to be correct

Case serial number does not match data plate serial number.

Both mags produced spark when tested manually by rotating drive end using electric drill on drive end.

Thumb compression results are as follows:

#1-Little compression. .012 tappet clearance on exhaust side, no clearance intake side#2-No compression. .009 tappet clearance on intake side, no clearance exhaust side.#3-Little compression. No clearance on either valve.

#4-No compression. .007 clearance on intake side, .010 clearance on exhaust side.

Light scoring found within oil pump housing, gears showed no signs of damage.



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All pushrods within the engine showed varying signs of cracks, deformation, or other damage signatures.

- #1 and #3 pushrods show signs of wear /polishing around circumference of rod on valve end
- #1 exhaust pushrod found to be steel, corrosion present, all others in engine are aluminum
- #2 exhaust, aluminum pushrod with deep radial groove, small crack on one end
- #2 intake, multiple cracks on ends
- #3 exhaust, radial groove present on one end
- #4 exhaust, 1/2" wide depression on rod, crack on rod ends





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Camshaft has what appears to be the word "unairworthy" etched on the drive gear end for unknown reasons.



Piston pin plugs from the number 1 and number 2 piston show varying damage signatures. A large dent was observed on one of the number 1 cylinder plugs while both plugs from the number 2 cylinder had a series of small dents and tool type marks present.



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Cylinders installed on engine at time of engine exam were not Lycoming OEM cylinders.



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Narrative

The Investigation

Engine examination occurred July 18th-20th at the Lycoming Engines factory in Williamsport, PA with oversight provided by the El Salvador Civil Aviation Authority.

History of Flight

As reported in the ICAO accident notification report from the Centre de Adiestramiento Aereo Avanzado (CAAA). Aircraft registered as YS-332PE took off from MSSS on Dec 11th, 2016 at 06:40am local time with two people on board, one female flight instructor and one male pilot student along with 3 hours of fuel. Purpose of flight was instructional, headed to "Sector 4" (Ingenio La Cabana, Rwy code MSCB). At 07:07 am local time, Ilopango tower (MSSS) ATC lost communications with YS-332PE. At 07:30 am local time, a commercial aircraft flying at 30,000ft above the accident site reported an active ELT signal. Accident aircraft was found at 09:00 am local time by another aircraft from the same flight school as YS-332PE

Aircraft Information

1977 Piper PA-38-112, S/N 38-78A0663

Meteorological Information

Not provided with this foreign engine examination

Medical Information

Not provided with this foreign engine examination

Pilot Information

Not provided with this foreign engine examination

Witnesses

Name & Address	Phone	Statement Included	Remarks:

Wreckage Disposition

Insurance:	Salvage and Storage:	

Investigative Participants

Name & Address	Phone	Organization
Jose Carlos Rodriguez		El Salvador Civil Aviation Authority
Mike Caldera	570-327-7017	Lycoming Engines, Air Safety Manager
Matt Schuman	570-327-7081	Lycoming Engines, Factory Service Anaylyst
David Harsanyi	570-327-7089	Lycoming Engines, Air Safety Investigator

Investigator Name:	David Harsanyi, ASI	Date: 1/8/18
Signature:	DMH	
Air Safety Manager:	Mike Caldera, Air Safety Manager	Date: 1/10/18
Approval Signature:	MEC	