FINAL REPORT

AAIU Synoptic Report No: 2006-022
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In accordance with the provisions of SI 205 of 1997, the Chief Inspector of Accidents, on 4/10/05, appointed Mr. John Hughes as the Investigator-in-Charge to carry out a Field Investigation into this occurrence and prepare a Synoptic Report.

Aircraft Type and Registration:	Piper Pacer PA 20/22 G-APYI
No. and Type of Engines:	1 x Lycoming O-290-D2
Aircraft Serial Number:	22-2218
Year of Manufacture:	1954
Date and Time (UTC):	21 August 2005 @ 17.45 hrs
Location:	Ballyboy, Athboy, Co.Meath
Type of Flight:	Ferry Flight
Persons on Board:	Crew - 1 Passengers - Nil
Injuries:	Crew - Nil Passengers - Nil
Nature of Damage:	Propeller tip damage, starboard main wheel spat and damage to wing surfaces
Commander's Licence:	Commercial Pilots Licence
Commander's Details:	Male, aged 50 years
Commander's Flying Experience:	2,000 hours of which 500 were on type (tail dragger)
Information Source:	AAIU accident report form submitted by Pilot.

SYNOPSIS

The tail wheeled aircraft took off from a private airfield in Navan for a ferry flight to a neighbouring airfield at Athboy, a few miles distant. On climb out, the pilot attempted to correct a tendency to swing left with application of right rudder. However, even full right rudder input failed to fully correct this tendency. On landing at Athboy a crosswind weathercocked the aircraft to the left and with insufficient right rudder available to the pilot, the aircraft impacted a ditch and came to rest. Subsequent investigation showed considerable play between the right pedal bolt and its attachment to the torque tube.

FINAL REPORT

1. FACTUAL INFORMATION

1.1 History of the Flight

The pilot agreed to ferry the aircraft from his private airfield in Navan to a neighbouring airfield in Athboy owned by the owner of the aircraft. He started the aircraft and initiated a 90° ground turn to the right in order to backtrack up RWY 27 for departure. The pilot said that the aircraft controls were functioning properly and in the correct sense at this stage. Another 180° turn to the right was executed at the runway threshold prior to take-off. On application of full power during take off, a tendency to swing left was corrected using right rudder.

The pilot said that further right rudder was applied in the climb out and at 500ft QNH he retracted the flaps. He then noticed that his right foot was more forward than was normal in the climb and that the rudder ball was indicating that insufficient right rudder was being applied. His foot came to the end of right rudder pedal travel but the aircraft was still yawing to the left.

For a number of reasons the pilot decided to continue the flight and to land at Ballyboy rather than return to his own airfield. He made his approach to RWY 29, went over its threshold at about 50 mph and touched on at low speed. He was some distance up the runway when a small cross wind from the left weathercocked the aircraft towards a wire fence inspite of right rudder input by the pilot. The aircraft went through the fence, finally coming to rest with the left wing in a hedge which ran perpendicular to the runway. He shut down the engine and completed the aircraft shut down checks before exiting the aircraft uninjured in the normal way. Later he examined the rudder pedals with the owner of the aircraft and stated that movement of the pedals was not being impeded.

1.2 Damage to the Aircraft

Damage was done to the starboard wheel spat, the underside of that wing and the top surface fabric and leading edge of the port wing. Both propeller blade tips were found deflected forward and the spinner back plate had two areas of damage. The port front wing strut was also damaged, as was the front tube of the undercarriage. The aircraft outer fabric was damaged in numerous places necessitating repair. The engine will require removal for shock loading test.

1.3 Aircraft Information

1.3.1 History

This aircraft was originally manufactured as a Piper PA-22-135, called a Tri-Pacer. It had a nose wheel and nose-wheel/rudder ground steering system. The Tri-Pacer was a special version of the original Piper PA-20 Pacer, which had a 135 HP engine and a full swivelling tail-wheel. The control system of the Tri-Pacer differs from that of the Pacer in that the rudder pedals are connected directly to the nose wheel for ground steering instead of to the tail, and the aileron cables are connected with the rudder cables to provide automatically coordinated aileron and rudder controls for simplified handling in the air. The aircraft did not fly between 1986 and April 1990 and during that time the aircraft was converted back to a tail wheel configuration using an approved kit under Supplemental Type Certificate (STC) SA45RM. As part of the STC the left side pilots pedal and brake system were also modified. The aircraft has a total of 3011 hrs flying time.

The Certificate of Registration was issued in February 1995 and the Certificate of Airworthiness in May 2004. The stall speed of this aircraft with flaps out (dirty) is 42 kts (48 mph) and the landing roll is 650 ft.

1.3.2 Aircraft Servicing

An Annual Check was completed on 29/4/05 when the aircraft had a total of 3010.45 hrs flight time. The check was completed satisfactorily in accordance with Maintenance Schedule CAA/LAMS/A/1999 issue 1, and its worksheets signed by the aircraft inspector. Although task 89 – *"Control cables for correct tension. Control neutrals and travels"* was signed for, the results of the check were not actually recorded on the worksheet.

1.4 Aircraft Inspection

1.4.1 Inspection by Aircraft Inspector

Following the incident, the Aircraft Inspector who had completed the Annual Check in April 2005 carried out a full and thorough examination of the aircraft. In his report he stated that when he examined the aircraft he found the separated components of the fire extinguisher lying on the cabin floor on the co-pilots side. He also had removed the bolt from the pilots right hand rudder pedal to investigate the movement between the pedal and the rudder bar. He removed all parts of the fire extinguisher from the aircraft.

1.4.2 Inspection by the Investigation.

The aircraft was inspected by the Investigation in the owner's hangar following the incident. It was found that the pilot's right pedal did not give full and free movement of the rudder cable or rudder. However, a check of the co-pilot's right seat pedal system gave an adequate deflection of the rudder.

The Investigation found that the bolt and nut fixing the pilots right pedal to the rudder bar had been removed and left on the floor of the cockpit. This bolt (AN4-13A) was re-installed in the pedal system.

Further investigation revealed that although the bolt was of the correct size, the hole into which it fitted in the torque tube had become elongated and oversize, resulting in considerable play in the pilots right rudder pedal system.

The aircraft fire extinguisher was not in situ in the footwell but was found on a nearby bench. It was fully discharged with its Bakelite head broken in half and separated from the body. There was a considerable amount of corrosion between the aluminium bottle and the Bakelite head. Some of the same corrosive substance was also noted on the cockpit carpet where the bottle would normally be installed by a clasp.

1.5 Operator Statement

The owner stated that, to the best of his knowledge, the fire extinguisher was in its mounting bracket after the incident. The pilot confirmed that the extinguisher had not been located in the footwell at the end of his flight.

2. ANALYSIS

Pilot pre-flight checks prior to the first flight of the day would ensure that all loose equipment is correctly stowed and that the aircraft is free of all extraneous items. Examination of the clasp following the incident would indicate that it was serviceable at the time of flight. If the 10" extinguisher bottle was loose on the floor of the cockpit, it is possible that it might roll forward but it would then have to roll over the rudder bar between the pedals, which are 5.5" apart, and lodge behind the co-pilots RH pedal. However, both the pilot and the owner confirm that the fire extinguisher was not in the footwell after the incident. The owner also confirmed that the fire extinguisher was in its proper place after the incident. It is also possible that the extinguisher was inadvertently broken and removed from its clasp sometime after the incident and prior to the Aircraft Inspectors visit.

The aircraft is over 50 years old. Whilst other bolts and nuts were replaced due to service wear there is no record of any work being carried out on the pedal system apart from the conversion in 1989. The original manufacturers bolt type and torque tube were retained.

It is of interest to note that in 1992 the FAA issued approval for modification kits STC SA8334SW and STC SA45RM, both to include dual brake system, new linkages and new torque tubes. This would have been a better option than the modification carried out previously. Due to the time gap between the incident date, the aircraft inspectors visit and the commencement of the Investigation it is not possible to ascertain with certainty the reason for the deterioration in play between the pedal bolt and the torque tube.

3. CONCLUSIONS

(a) Findings

On landing the Pilot had insufficient right rudder available to keep the aircraft on the runway.

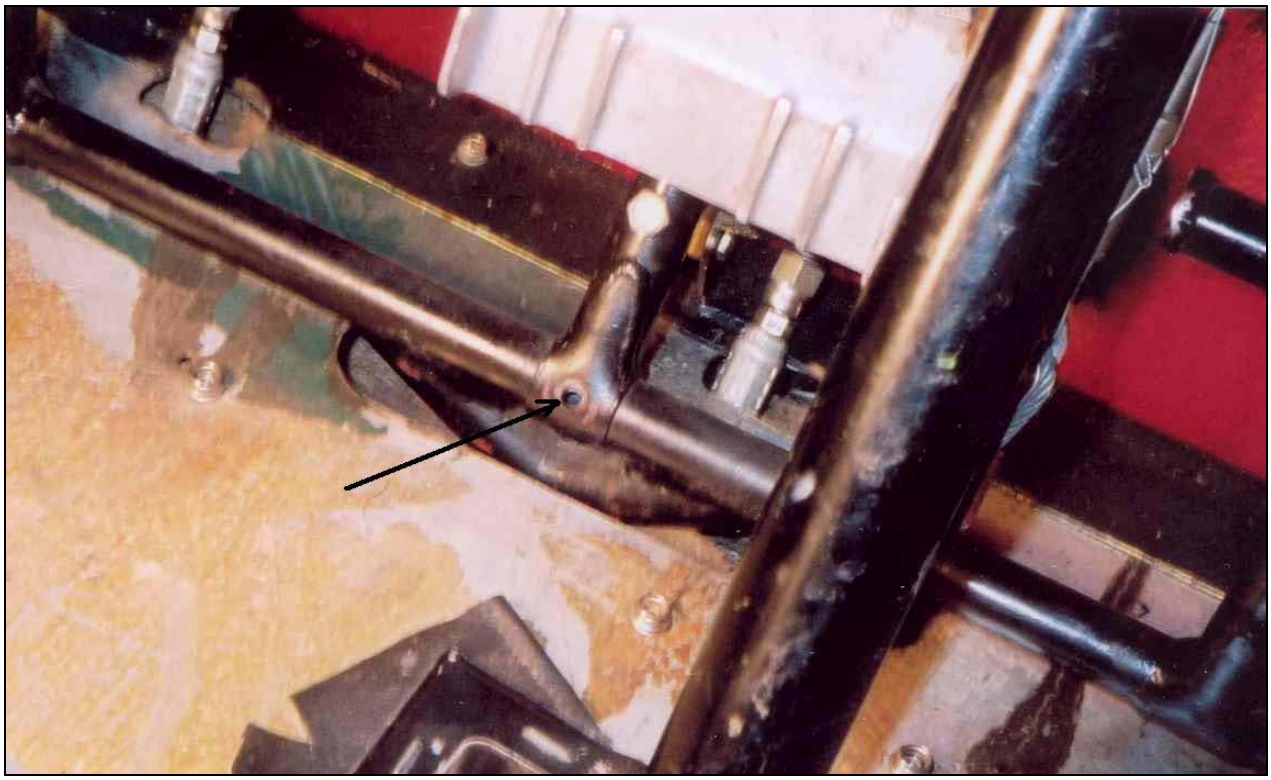
(b) Cause

There was excessive play between the pilot's right pedal and the torque tube due to elongation of the bolt hole in the tube.

4. SAFETY RECOMMENDATIONS

4.1 This report does not sustain any Safety Recommendations.

APPENDIX A



A view of the pilot's RH pedal showing the elongated hole with the bolt removed

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