AAIU Synoptic Report No.: 2003-009
AAIU File No.: 2002/0044
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Aircraft Type and Registration:	Piper PA 22-135 N2652P
No. and Type of Engines:	One Lycoming O-290
Aircraft Serial Number:	22-2992
Year of Manufacture:	1955
Date and Time (UTC):	23 August 2002, 13.00 hours
Location:	RWY 34, Hacketstown Airstrip, Co. Carlow
Type of Flight:	Private
Persons on Board:	One
Injuries:	No reported injuries
Nature of Damage:	Aircraft inverted, damage to port wing braces and engine.
Commanders Licence:	PPL
Commanders Age	54 years
Commanders Flying Experience:	355 hours
Information Source:	Information supplied by the pilot of N2652P AAIU Investigation

SYNOPSIS

The aircraft was attempting to take-off on RWY 34 at Hacketstown. The aircraft had just lifted off when a gust of wind caught the tail of the aircraft. The pilot immediately abandoned the take-off but the aircraft flipped over on to its back and continued, inverted, along the runway for some distance.

NOTIFICATION

The pilot did not report this accident to the AAIU until 26 August 2002. On 27 August 2002, in accordance with the provisions of SI 205 of 1997, Air Navigation (Notification and Investigation of Accidents and Incidents) Regulations, 1997, the Chief inspector of Accidents decided to conduct a Field Investigation into this occurrence.

1. FACTUAL INFORMATION

1.1 History of the Flight

The pilot lined up the aircraft at the threshold of RWY 34 for a solo flight in her aircraft. The aircraft had just lifted off, at a point 130 metres from the threshold, when a gust of wind took the aircraft to the right of the centreline of the runway. The pilot stated that she overcorrected and the aircraft quickly yawed to the left. Having corrected this yaw the pilot decided to abort the take off. At touchdown the pilot said that the brakes were applied too severely and the aircraft flipped over on to its back. The airfield owner's son rushed to the aircraft with a fire extinguisher. The pilot exited the aircraft unaided. The pilot said that in order to facilitate the re-opening of the runway, the aircraft was dragged inverted across the airfield and located near the control tower. The aircraft was found covered with black plastic sheeting when later inspected by the Investigation.

1.2 Injuries to Persons

There were no reported injuries.

1.3. Damage to Aircraft

Internal damage to port wing and to the port wing lift struts. Damage to leading edge of starboard wing tip. The right wheel spat attachment was fractured. Damage to propeller and engine oil cooler. Windscreen broken. There was some structural damage to fuselage steel tubing in cabin ceiling area. Other internal structural damage may be revealed when the outer fabric cover is removed during strip down.

1.4 Personnel Information

The pilot received a Student Pilots Licence on 7/12/93 and, following further training in Ireland and the USA, received a Private Pilots Licence, issued by the IAA, valid from 9/10/96 to 31/10/97.

In early 1997 the pilot made incursions into Controlled Airspace (CTA) at Dublin Airport. ATS raised Mandatory Occurrence Reports on these occurrences and following discussions with the IAA the pilot was requested to carry out exercises in Navigational Techniques with an instructor. The IAA imposed a licence endorsement whereby the pilot could only act as co-pilot until further notice. Training flights in Cessna aircraft were undertaken during January1998.

The pilot's PPL licence was renewed on 22/5/98 with Special Conditions attached thereto. The pilot then completed 12 hours of flight training and 35 hours of ground instruction. In August 1998, an IAA designated instructor reported that the pilot had failed a "skills test". However following almost 30 hours of further formal training using Cessna150 aircraft, the pilot passed this test and on the 9/3/2000 the restrictions on the licence were lifted. On 14/11/2001 flight training was taken in a Cessna150 for the revalidation of the licence. The licence was validated until 31/10/2003.

The pilot's logbook, which has some minor errors of addition, records the pilot's flying experience, since acquiring the aircraft, as follows:

Year	Training on other aircraft P1	P2& PUT	Pacer (P1)	Pacer (P2)	Pacer PUT
1995			7.00	9.15	
1996	2.00		43.13		
1997		7.00	27.02	3.35	
1998	2.30	6.49	24.26	6.25	
1999		29.21	6.18		00.45
2000		4.25	16.29	3.02	
2001		1.20	19.16		
2002			3.55		
Total	4.30	48.55	147.39	22.17	00.45

P1-Pilot in command, P2–Pilot under supervision, PUT- Pilot under training

1.5 Aircraft Information

This aircraft was originally manufactured as a Piper PA-22-150, called a Tri-Pacer. It had a nose wheel and nose-wheel/rudder ground steering system. The brakes were actuated by a hand brake control located under the centre of the instrument panel. The Tri-Pacer was a special version of the Piper PA-20 Pacer, which had a 135 HP engine and a full swivelling tail-wheel. However, the tricycle landing gear of the PA-22-135 is not immediately interchangeable with the standard Pacer tail wheel gear as the fuselage of the Tri-Pacer incorporates factory modifications to permit the fitting of the nose wheel and the mounting of the main legs further aft.

1.5.1 History of N2652P

In 1969, the 150 HP Lycoming engine of this aircraft was replaced by a 135 HP engine and the aircraft became a PA-22-135 aircraft. Consequently, a new flight manual was also issued and installed.

In 1985, the aircraft was converted to a PA-20 type aircraft configuration by installing a contractor's kit, thereby removing the nose wheel and installing a tail wheel. FAA approval was issued for this modification under a Supplemental Type Certificate (STC). The dual brake and pedal system were also modified at this time. Such a converted aircraft is also known as a PA22/20 aircraft. A new weight and balance sheet was added to the new flight manual supplement. The 1995 FAA Registration, shows the aircraft as a PA-22-135 as does the Airworthiness Certificate. The continued validity of this certificate is conditional on the performance of an annual inspection.

In early 1995, the aircraft was crated, sent to Ireland and reassembled by a UK CAA licenced engineer, the work being completed by October 1995.

Prior to its despatch from the USA a considerable amount of work had been carried out, particularly on the engine. The aircraft was held in trust by a citizen of the USA living in Ireland and the pilot at the time of this accident was the trustor. It is believed that the pilot is the beneficial owner.

In 1996, the tail wheel spring broke during a heavy landing incident at Rathkenny Aerodrome, Co. Meath, and was replaced along with new tail brace wires. A new rear panel was also installed at the time and the main landing gear attachment bracket was welded.

In April 1999, the aircraft was rendered a total loss when it struck a fence on take-off from a field in Co. Armagh. However, the pilot's logbook does not adequately record this accident. It is reported that there were two pilots on board at the time. Neither the USA NTSB, the UK AAIB, or the AAIU have a record of the accident. The UK licenced engineer, who assembled the aircraft on arrival from the USA, subsequently repaired the aircraft. The aircraft was put back into service in December 1999, the repairs being recorded in the aircraft logbook.

On 12 August 2002 an annual inspection was carried out. The engine oil filters were changed, cylinder compression checks carried out. All controls and old repair areas were also checked at this time. All aircraft Airworthiness Directives issued for this aircraft type were checked up to that date.

1.5.2 Airframe and Engine Times

The aircraft log books recorded a total time of the aircraft at 2,483.6 hours since new. A total airframe hours of 2,304.9 hours was flown in the USA.

The US logbook records that in 1969 the engine hours in service was 1054 hours since overhaul. On arrival in Ireland in 1995, the engine had a time of 1399 hours since overhaul. Since then, 198 hours have been added making a total of 1597 hours. The recommended overhaul period for this engine is 1500 hours.

1.5.3 Engine Details.

Type 0290 D2	Lycoming 135 HP	Serial No. 4399-21
Time Since New	2818 hrs.	
Time Since Overhaul	1597 hrs.	Overhaul prior to 1969
Time Since Top Overhaul	383 hrs.	Top overhaul in 1985
(Time Since Four Cylinder Overhaul)	200 hrs.	Carried out in 1995

2. ANALYSIS

2.1 Stability On The Ground. (See Appendix A)

With this type of aircraft, a high CG and narrow spaced wheels increases the tendency for the aircraft to tip over on the ground when turning, when brakes are applied to stop, or when high power is applied on take-off. A high thrust line also increases the tendency to pitch over on its nose when high power is applied, especially with the application of brakes. The high keel surfaces also allow crosswinds to have a greater destabilising effect.

In a four-year period in the USA there were 18 accidents or incidents involving the Piper PA 20 tail wheel aircraft. In 50% of these the occurrence was due to either one or all of the following:

- A gust or change of wind direction at rotation.
- Application of brakes causing loss of control.
- The pilot's failure to maintain directional control (fishtailing).
- Lack of experience in a conventional landing gear type aircraft- (i.e. tail wheel).

2.2 Since 1995 the pilot's number of hours flown have been steadily decreasing. In 2002 the pilot had flown only 3.55 hours in this aircraft. It is difficult to retain currency under these circumstances particularly with a tail wheel aircraft. On take off, with the CG so near the main wheels, braking will tend to pitch the CG forward about the braked wheels thereby pulling the nose of the aircraft down.

Originally this PA-22-150 nose-wheeled aircraft had a 150 HP engine installed. The engine was then replaced with a 135 HP engine and became a PA-22-135 aircraft. Following the landing gear modification in1985 the aircraft is also known as a PA22/20.

The power rating is 135 HP at a maximum engine speed of 2600 RPM. At 2200 RPM the actual HP available is reduced further to 114 HP at take-off. As the PA-22 has been certified with a 150 and 160 HP engine consideration should be given, with advice from the aircraft manufacturers, to increasing the HP of the power plant of this aircraft. This would be particularly beneficial on take-off with two people on board.

Since the endorsement of the pilots licence in 1998, a further 50 hours of training was carried out, mostly on lighter nose-wheeled Cessna 150 aircraft. This was also occurring at a time when the hours flown on the Pacer were declining. The investigation is of the opinion that the very low recent experience on this aircraft was a contributory factor to this accident.

3 CONCLUSIONS

3.1 Findings

3.1.1 The aircraft inverted following an aborted take-off.

3.1.2 In the 8 months up to the time of the accident, the pilot had completed less than 4 hours of flying in this aircraft.

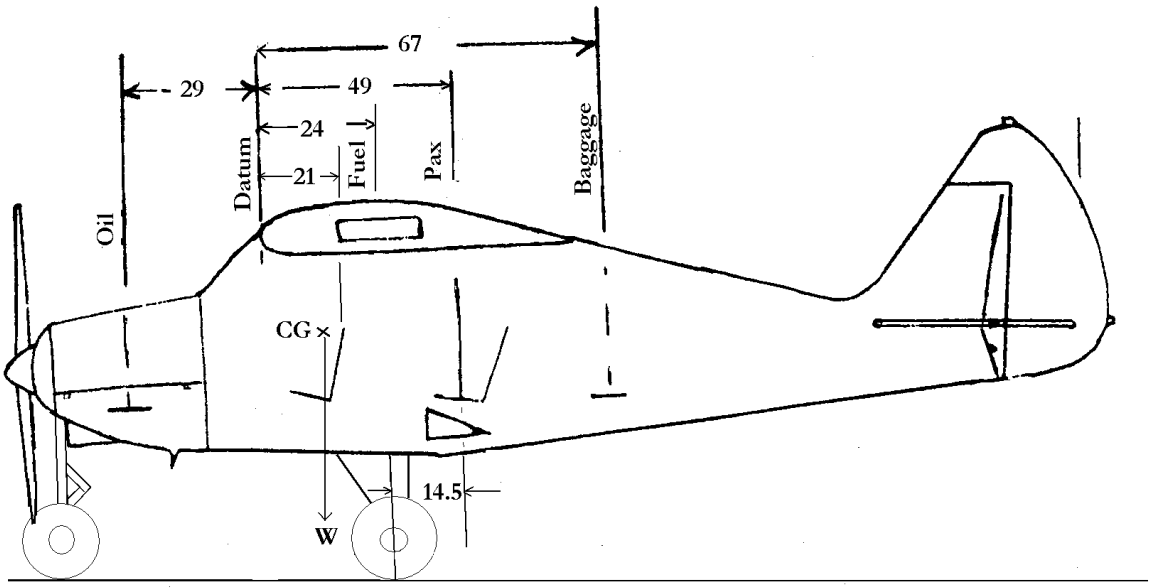
3.2 Causes

The pilot applied severe braking following an aborted take-off, causing the aircraft to tip over the main wheels and invert.

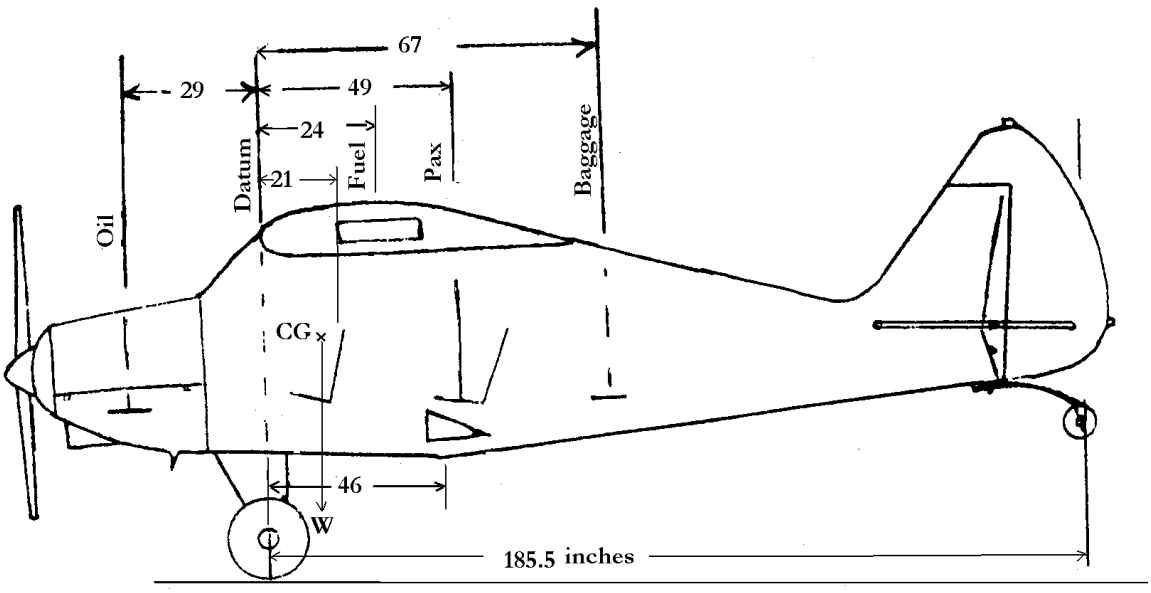
4 SAFETY RECOMMENDATIONS

4.1 The JAA should review the very low annual flying time requirement for the renewal of a PPL. **(SR 19 of 2003)**

Appendix A



Above: The original position of the nose and main undercarriage of the PA 22-135 aircraft



Below: The main undercarriage position moved forward 31.5 inches following the modification to the PA 20-135 configuration.