"Quickie-Type" Aircraft Accident Analysis, February 2018

Introduction

This analysis of Quickie aircraft accident data is an attempt to do a comprehensive collection of data from U.S. FAA and NTSB databases available online and to summarize the accident and registration data in an effort evaluate accident data with respect to causes, probability of accidents. This study is not sanctioned by any official body, nor has it been reviewed for accuracy, but it should provide general information to those interested in Quickie-type aircraft.

Analysis: Entire Fleet

All Q-type accidents have been broken down according to my determination of primary cause.

These **Primary Causes** are as follows (alphabetical order):

1. **Bad CG loading**: Pilot failed to understand or intentionally load the plane out of CG envelope.
2. **Bounced Landing**: Combination of flaring high, bouncing, failing to recover lead to accident.
3. **Builder Error**: Everything from bad rigging, cable shackles, over wing gas tank, bad wing repairs, etc.
4. **Canard Contamination:** Adverse pitch effects on one or both sides of GU canard from moisture.
5. **Engine:** Any engine failure (partial/complete) because of ignition, control cables, carb/adjustment/ice, heads, valve trains, poor maintenance, or unknown causes.
6. **Fuel Exhaustion:** Running the engine out fuel because of insufficient fuel for flight, or tank mismanagement.
7. **Fuel Starvation:** No fuel to engine because of blocked lines or filters, or water in system.
8. **IMC:** Flight into IMC leads to accident
9. **Lost directional control:** Pilot lost directional control on landing or takeoff and departed runway with no obvious control system failure.
10. **Lost Sparrow Strainer:** Sparrow strainer broke off during flight.
11. **Medical:** Probable medical problem on takeoff.
12. **Midair:** Midair collision in cruise flight.
13. **Overweight, low power:** self-explanatory
14. **Poor Piloting:** Includes accelerated stalls, confusing control inputs, density altitude problems, high or low approaches, incorrect reflexor settings, or lack of proficiency.
15. **Prop delamination:** Prop delamination while in flight.
16. **Tailwheel spring failure:** Failure of the tailwheel spring leading to loss of directional control on takeoff or landing.
17. **Taxi accident:** self-explanatory occurred on ramp.
18. **Unintended takeoff:** Unprepared pilot/plane or unexpected flight leads to accident.
19. **Wake turbulence:** Flight in wake turbulence lead to loss of control
20. **Wrong prop:** Use of an overpitched prop leads to insufficient performance and accident.
21. **WTF:** You need to read the accident report.

Below are the accident numbers ranked by frequency of the **Primary Causes**:

1. **Engine:** ***37*** *accidents*, **8** Fatalities, **6** serious injuries, **12** minor injuries, **17** uninjured.
2. **Bounced Landing**: ***28*** *accidents*, **0** Fatalities, **2** serious injuries, **4** minor injuries, **26** uninjured.
3. **Lost directional control:** ***21*** *accidents*, **2** Fatalities, **1** serious injuries, **8** minor injuries, **13** uninjured.
4. **Poor Piloting:** ***21*** *accidents*, **6** Fatalities, **8** serious injuries, **6** minor injuries, **7** uninjured.
5. **Builder Error**: ***9*** *accidents*, **5** Fatalities, **0** serious injuries, **0** minor injuries, **6** uninjured.
6. **Fuel Exhaustion:** ***9*** *accidents*, **2** Fatalities, **2** serious injuries, **3** minor injuries, **3** uninjured.
7. **Fuel Starvation:** ***9*** *accidents*, **0** Fatalities, **2** serious injuries, **4** minor injuries, **5** uninjured.
8. **Unintended takeoff:** ***5*** *accidents*, **1** Fatality, **1** serious injuries, **0** minor injuries, **3** uninjured.
9. **Tailwheel spring failure:** ***4*** *accidents*, **0** Fatalities, **0** serious injuries, **0** minor injuries, **5** uninjured.
10. **Canard contamination:** ***4*** *accidents*, **0** Fatalities, **0** serious injuries, **0** minor injuries, **4** uninjured.
11. **Prop delamination:** ***4*** *accidents*, **0** Fatalities, **1** serious injuries, **5** minor injuries, **0** uninjured.
12. **Wrong prop:** ***3*** *accidents*, **0** Fatalities, **0** serious injuries, **1** minor injuries, **2** uninjured.
13. **All others:** ***15*** *accidents*, **9** Fatalities, **2** serious injuries, **5** minor injuries, **3** uninjured.

Commentary:

The majority of primary cause(s) of accidents in U.S. registered Q's are not really that different than other U.S. homebuilt accident causes. Engine/powerplant related items account for the majority of the Q-type accidents, although their severity may be complicated by speed and flight characteristics of the Q when it comes to emergency landings.

Continental O-200 engines have clearly proven to be more reliable than other engines installed in Quickies, with no engine failures that lead to reportable accidents. However, it is worth noting that there have been a total of 4 propeller inflight prop failures that have resulted in Q-200 accidents. All 4 of these have all been on props mated to O-200 engines.

A total of 77 of 166 accidents can be attributed to engine failures, fuel delivery, builder errors, prop failure, incorrect prop selection, medical problems, a midair collision, flight in wake turbulence, or bad CG computations.

The way I see it, this leaves just 89 of Q-type accidents that can be linked to the aspects of Q-design itself.

Of these 89 design related accidents, landing accidents such as flaring too high/slow then bouncing the landing and/or losing directional control on the runway during takeoff/ landing (including tailspring failures and canard contamination) accounts for 57 accidents. Leaving 32 accidents from other causes.

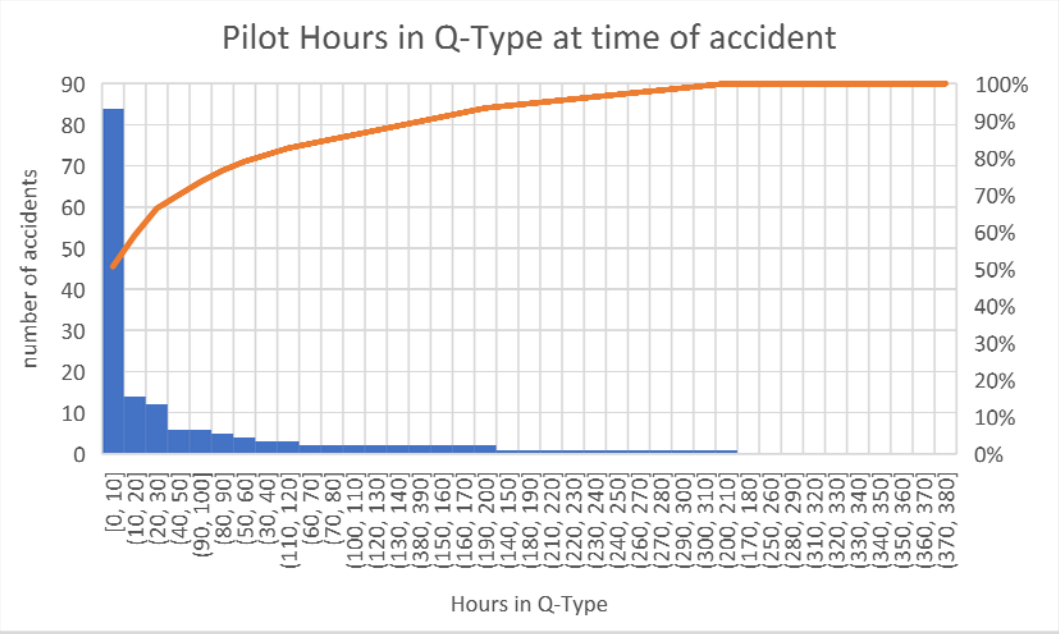
Poor piloting/proficiency and poor pilot decision making including flight into IMC accounts for 22 of the remaining accidents.

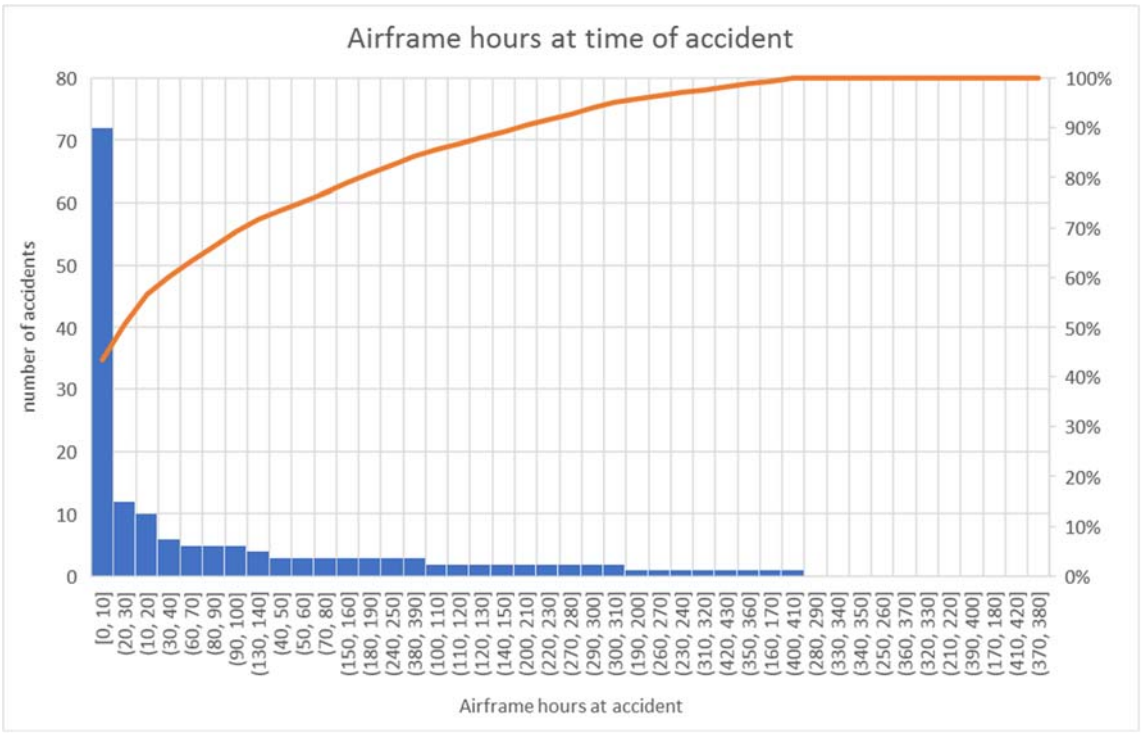
If all of the above accidents could be considered "avoidable" with proper attention to pilot proficiency/familiarization training, appropriate attention to engine and fuel system design, inspection and maintenance, and/or acceptable construction/repair practices, then only about 10 accidents can be

considered totally unavoidable. Clearly Q-types can exhibit better safety if we exercise appropriate due diligence.

The summary graphs below show time on airframe at time of accident and pilot time in type at time of accident. More than 50% of accidents (all primary causes) occur when a pilot has less than 10 hours in a Q-type. In addition, almost 50% of all accidents (all primary causes) occur on airframes that have less than 10 hours on them. This speaks to the importance of pilot familiarization/training and careful evaluation of newly constructed aircraft systems. Nothing new there, but worth repeating.

Summary Graphs:




Airframe hours at time of accident
number of accidents
Airframe hours at accident
80
70
60
50
40
30
20
10
0
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
[0, 10]
(20, 30]
(10, 20]
(30, 40]
(60, 70]
(80, 90]
(90, 100]
(130, 140]
(40, 50]
(50, 60]
(70, 80]
(150, 160]
(180, 190]
(240, 250]
(380, 390]
(100, 110]
(110, 120]
(120, 130]
(140, 150]
(200, 210]
(220, 230]
(270, 280]
(290, 300]
(300, 310]
(190, 200]
(260, 270]
(230, 240]
(310, 320]
(420, 430]
(350, 360]
(160, 170]
(400, 410]
(280, 290]
(330, 340]
(340, 350]
(250, 260]
(360, 370]
(320, 330]
(210, 220]
(390, 400]
(170, 180]
(410, 420]
(370, 380]