EXPERIMENTAL AMATEUR-BUILT

- AMATEUR-BUILDERS
  - PAST
  - PRESENT
  - FUTURE

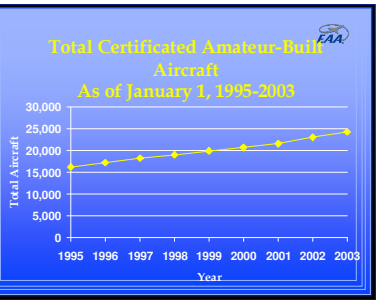
- PAST AMATEUR-BUILDERS
  - Highly experienced
  - Independent
  - Many Engineers and Mechanics

- PRESENT BUILDERS
  - Diverse backgrounds
    - Engineers to Opera Singers
    - Ultralights to Air Racers
    - Many new to aviation
  - Independent

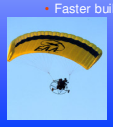
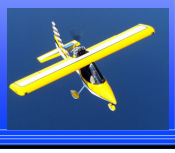
- PRESENT BUILDERS
  - Average age 54
  - Average Income over $80,000
  - Over 80% College educated
  - 90% Pilots
  - Over 44% own multiple aircraft

- WHY THE CHANGE FROM PAST TO PRESENT
  - 1970's marked the change for amateur-built aircraft
    - Burt Rutan
    - BD5
    - T18
  - Decline of small aircraft manufacturers
  - Introduction of kits
  - Perception and reality of better product

- From 1970 to present Experimental amateur-built aircraft went from less than 1% of the single engine fleet to 20% of the single engine personal use fleet in the U.S.
- Over 2000 new amateur-built aircraft flown each year
- Over 2000 new Ultralights each year



- More light/UL aircraft
  - Powered Parachutes
  - Sport Pilot
  - Faster build

- More high and fast
  - Reno Air Races
  - Decline of Warbirds
  - Executive Recreation
  - Jet Engines

THE BUILDING PROCESS

- BUILDING AN AIRCRAFT
  - Deciding what aircraft to build
  - Shop set-up
  - Builder's support
  - Changes

- Deciding what aircraft to build
  - Emotion
  - Availability / Location
  - Mission

- Setting up shop
  - Builders shop tells a story
    - Cleanliness
    - Environment Heat/Cooling
    - Tools

- Building
  - Kit Manufacturer Support
    - Manuals
    - Prints
    - Diagrams
  - EAA Chapter Support
    - Networking / Encouragement

- The EAA Technical Counselor program was started in 1965 as the EAA Designee Program
- Today there are over 1000 Technical Counselors in 7 countries

- Technical Counselor's qualifications include:
  -Built an amateur-built or ultralight aircraft, or
  -Restored an aircraft, or
  -Be an A&P, IA, DAR, DER or Aerospace engineer

- Approximately 50% of all Technical Counselors are A&P mechanics
- Approximately 95% have built or completely restored an aircraft

- Technical Counselors help ensure that a well-constructed, safe to fly aircraft is presented to the FAA for final inspection.
- As a testament to the Technical Counselors, amateur-built aircraft have not had a significant number of mechanical or structural failures as compared to standard category aircraft.

- Technical Counselors do not sign off any work!
  - They counsel
  - Provide information
  - Advise
  - Maintain communication with builder

- What problems do Technical Counselors and EAA find in the building process?
  - Very poor builders usually never finish their aircraft.
  - Most are very safety-conscious but remember they are amateurs so they do not always understand the safety effect of the decisions they make.

- Modifications to their aircraft not tested
- Two major areas to watch for problems:
  - Changes to the fuel system and
  - Changes to the personal restraint system (seat belts)
- Other areas may cause problems but have not been the cause of crashes.

- Manufacturers assist in many of the modifications but may not "approve" any of them.
  - Autopilots
  - Wing extensions
  - Larger tires
  - Extra Fuel
  - Door/canopy latches and seals

ACCIDENT DATA

- FAA stated in 1995 that over 20% of all amateur-built accidents will occur during the test period.
- The number of amateur-built accidents has been between 150 and 200 for the last ten years while the number of amateur-built aircraft has increased from 13,000 to 26,000.

Comparison of Amateur-Built vs. General Aviation Accidents

Amateur-Built

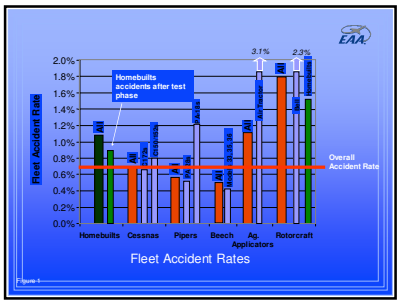
Year	AC total	Accidents	%Acc/AC	Fatalities	%Fatal/AC
1985	13,210	149	1.13	52	0.39
1990	16,998	158	0.93	65	0.38
1995	20,301	191	0.94	87	0.26
1996	21,037	204	0.97	75	0.36
1997	22,409	190	0.85	78	0.35
1998	23,824	234	0.98	88	0.37

General Aviation

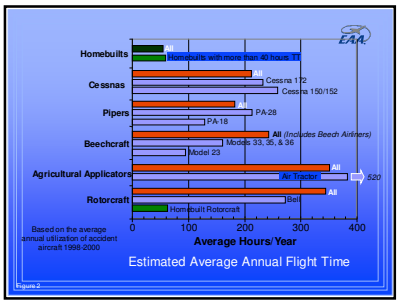
Year	AC total	Accidents	%Acc/AC	Fatalities	%Fatal/AC
1985	209,698	2,139	1.02	664	0.32
1990	210,085	1,692	0.81	560	0.27
1995	198,089	1,452	0.77	418	0.22
1996	194,790	1,907	0.98	615	0.32
1997	192,410	1,858	0.97	654	0.34
1998	191,562	1,907	0.99	615	0.32

OCTOBER 2004 KITPLANES MAGAZINE

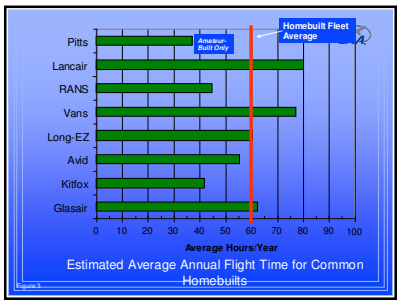
Ron Wanttaja



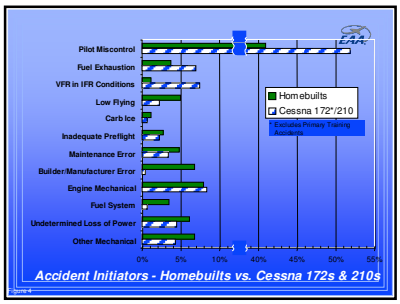
Fleet Accident Rates



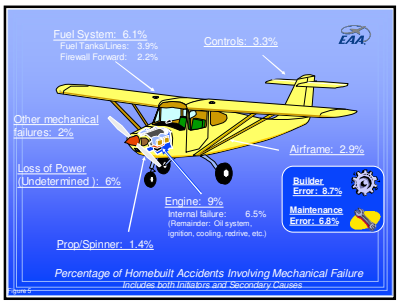
Estimated Average Annual Flight Time



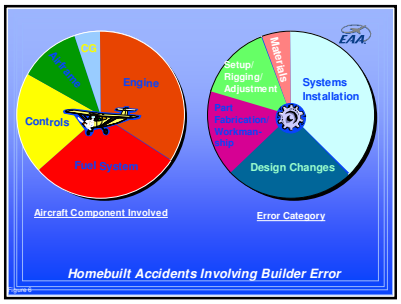
Estimated Average Annual Flight Time for Common Homebuilts

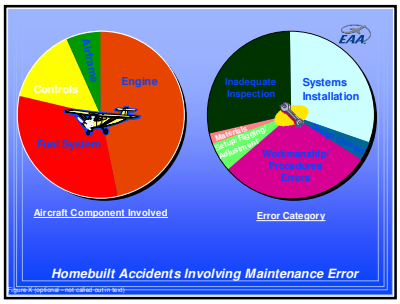


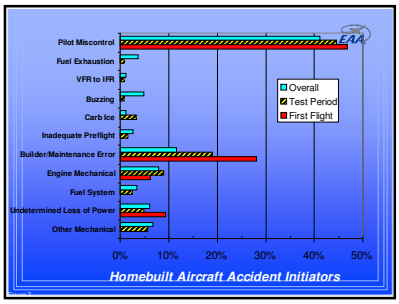
Accident Initiators - Homebuilts vs. Cessna 172s & 210s

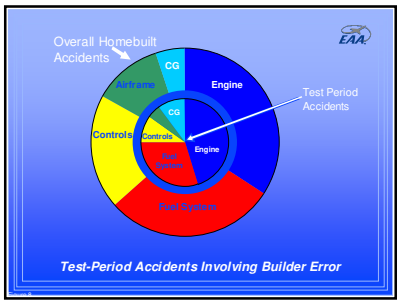


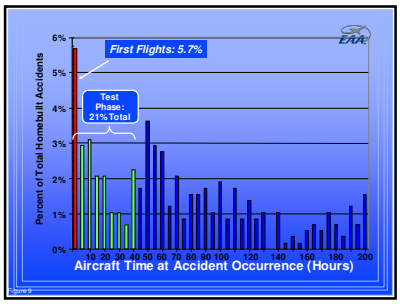
Percentage of Homebuilt Accidents Involving Mechanical Failure
Includes both Initiators and Secondary Causes





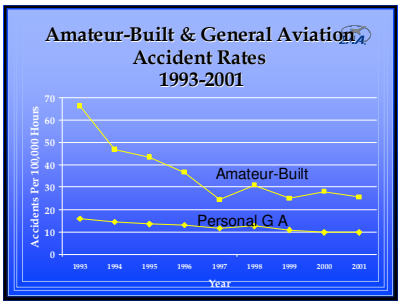


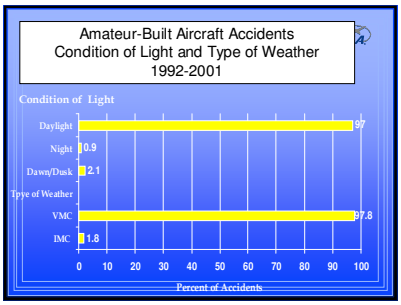




Amateur-Built Aircraft Accidents
Ten Most Common Aircraft Involved
1992-2001

Aircraft Type	Number of Accidents
KITFOX	90
RV-6	81
PITTS	68
LANCAIR	55
RV-4	48
GLASAIR	48
AVID FLYER	45
KR-2	41
LONG-EZ	40
VARI-EZ	39
ROTORWAY EXEX 90	37





Amateur-Built Aircraft Accidents
Breakdown of Broad Cause
1992-2001

Aircraft - 846
- Propulsion System and Controls - 84
- Flight Control System - 420
- Airframe - 86
- Landing Gear - 57
- Systems/Equipment/Instruments - 18

Environment - 130
- Weather - 42
- Light Conditions - 0
- Object (Trees, Wires, Etc.) - 6
- Airport/Airways Facilities, Aids - 4
- Terrain/Runway Condition - 72

Personnel - 2341
- Pilot - 1917
- Others (Aboard) - 5
- Others (Not Aboard) - 196

Characteristics of Amateur-Built Aircraft Accidents

- 20% occur during the first two flights
- Daylight - VFR
- No flight plan
- Summertime - good weather
- Older pilots
- Less experienced pilots
- 50% lack of familiarization with aircraft

FLIGHT TESTING

- Highly emotional activity.
- Pilots have been conditioned to think of flight testing as something only for those select few with the "Right Stuff".
- Most of us are not thinking clearly for our first flights, remember your first solo flight.

EAA FLIGHT ADVISOR

- EAA FLIGHT ADVISOR PROGRAM WAS STARTED IN AUGUST 1994
- THE OBJECT OF THE PROGRAM IS TO INCREASE SAFETY DURING THE EARLY PHASES OF FLIGHT IN A NEWLY RESTORED OR NEW SPORT AIRCRAFT

- When the program was introduced, the FAA claimed that over 20% of all homebuilt accidents occurred during the first two flights of an aircraft.
- The program has been successful in reducing both the overall accident rate and the first flight accident rate significantly.

- FLIGHT ADVISORS HELP
  - Pilots understand their aircraft
  - Evaluate aircraft vs. their needs
  - Find training in appropriate aircraft
  - Develop test plans
  - Develop new aircraft operating procedures

- EAA Flight Advisors are experienced aviators in their preferred type of aircraft such as:
  - Homebuilts high and low speed
  - Antiques high and low speed
  - Ultralights
  - Sea Planes
  - Gliders

- There are over 500 Flight Advisors in 9 countries
- Over 60% of Flight Advisors are CFI's
- All have over 1,000 PIC hours

- Why do you need a Flight Advisor?
  - It is a life insurance policy
  - Your wife will feel better
  - Your aircraft insurance will be lower
  - You are helping all of sport aviation by preventing additional regulation
  - Because it is the smart thing to do

- WHAT IS A FIRST FLIGHT?
  - First flight for an aircraft
  - First flight for a pilot

- Flight Advisors review the following with each builder/pilot:
  - Test pilot selection
  - Airport selection
  - Pilot preparation, health, safety equipment
  - Aircraft systems
  - Cockpit Familiarization
  - Weight and Balance

- Flight Advisors review the following with each builder/pilot (*cont.*):
  - Emergency Procedures
  - Control tower coordination
  - Data/video recording
  - Engine Break-in
  - Check Lists, preflight, taxi tests, first flight

First Flight Video

WHAT DID YOU SEE IN THE VIDEO?

- Location
- Spectators
- Preparations
- Modifications
- Weather

- What problems do we see with first flights?
  - Insufficiently prepared
    - High Speed taxi becomes first flight
    - No check lists, no plan
    - No training
    - Lack of flight training (Ultralights/high performance piloted by airline captains)
    - Desire to fly aircraft overcoming proper cautions

SAMPLE ACCIDENTS

- Berkut
  - Professional pilot
  - High Performance Airplane
  - Good Preparation for first flight
    - Flight Advisor
    - Large airport, low traffic, open fields
  - Poor division making
    - Flew with known defect

- Kitfox
  - Low Time Pilot
    - Chose test pilot for first flights
  - Good preparation
    - Received additional training
  - Known safe airplane
  - Flew first flight with no preparation because of peer pressure

- Sonerai
  - Professional engineer
  - Good preparation
    - Used available programs
    - Prepared test plan
    - Proficient in model aircraft
  - Major changes to aircraft
    - Wing, engine, fuselage

- Long EZ
  - Proven used aircraft
  - Experienced instrument pilot, new owner
  - Day VFR local flight
  - Known problem with fuel system
  - Impacted water nose first

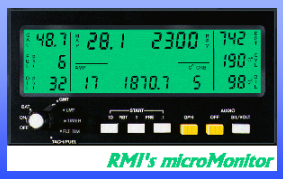
RV-6

- New owner, Private pilot
- Proven used aircraft
- Pilot had less than 10 hours in aircraft previous time in Cessna aircraft
- Landed at airshow during local cross country flight by mistake - last aircraft to leave prior to airshow
- Aircraft wing impacted runway on takeoff
- Day VFR windy

RV-9

- Manufacturer Aircraft
- Flown by factory pilot
- Highly Experienced
- Aircraft Equipped Day VFR Only
- VFR into IMC trying to make next appointment

DATA RECORDERS



DATA RECORDERS

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SECOND OWNERS

- Second owners of amateur-built aircraft is a rapidly growing challenge for EAA and FAA
- Owners less knowledgeable of experimental aircraft and applicable rules
- Second owners may not even know of EAA or its programs

- Important facts for non-builders to know
  - Experimental aircraft do not meet FAR Part 23 and do not have as forgiving handling characteristics as Part 23 or Car 3 aircraft
  - Flight Training is a must
  - Airworthiness is clearly the owner's responsibility

CONCLUSIONS

- Experimental Amateur-builders are capable individuals or they would not have completed an aircraft
- They are independent
- They are involved in amateur-builts because of the freedom from regulations

- If builders get the "right information" they will do the "right thing."
- Builders will resist FAA "Orders"
- AD example

OTHER INFORMATION

- EAA has many books and videos available for purchase including: First Flight in Your Homebuilt and First Flight in an Ultralight Videos
- EAA Sponsors the safetydata.com web page which has a tremendous library of Ultralight and homebuilt service difficulty reports and flight information

- EAA Information Services provide members with lists of builders of by make and model
- EAA Information Services provide members with a list articles that have been published on any particular aircraft including antiques and classics
  - (920) 426-4821

- EAA Library can provide CAFE reports
- EAA Library can also provide a copy of any article printed in an EAA publication
- EAA members only web page has all the CAFE reports on-line and a directory for all EAA magazines

- EAA Safety Program
  - Jan Streblow
  - (920) 426-6864
  - Safetyprograms@eaa.org