Maxford USA Antonov An-2 Incident, August 9, 2013

Parts recovered and removed at the field
broken APC 13x8E prop
cowl - broken plastic air scoop and dummy engine, lots of cracks in the fiberglass cowl
broken motor mount box - parts gathered and bagged
removed the left wing panels

At home
Noted that the ESC wires ran up through the bottom right of the motor box and out the right side
removed the O.S. Motor OMA-5010-810 motor
removed the Castle Creations Ice 50 ESC noting that 3 short cable ties made up the strap, the receiver lead ran through the bottom left hole in the former and power leads through the top left hole - no apparent damage to the ESC
removed the 4S “A123” 2300mAh battery - no apparent damage
removed right wing panels
removed top center section - plastic top had small cracks at the front and rear of right side - only cosmetic damage
removed lower wing rods
both lower wing fairings were loose - removed them
Noted damage to lower, right bottom wing fairing - the 3/4” square 1/16” ply had pulled away a bit from the wood of the fairing bottom
Both rear landing gear wires were slightly bent - straightened them by hand
Noted that the main gear collets were not in the correct position and gear at an ‘odd’ angle
Tactic TR624 receiver removed - installed in the Thunder Tiger Lazy Tiger Cub trainer plane and flown successfully on 8/10/2013.
Mounted power system to the test stand - the prop adapter and/or shaft appeared bent on the run up - ordered prop adapter and shaft from Tower Hobbies
Started piecing together the ‘jigsaw puzzle’ of the motor mount box
hooked up the Tactic TR624 out of the ‘Cub’ with a receiver battery rand checked all servos for possible stripping - all six servos checked out okay.
removed the broken strut from the top and bottom left wing panels - strut was not ‘broken’ but had separated at a glue joint
Noted a lot of damage at the root rib of the top left wing panel - the wood part that attaches the wing to the center section using the Maxlok key was out of the wing and had been bagged at the field - no real glue on the piece
Noted that I should attach the bottom of the wing struts first when putting the panels back together because of the angle
removed the strut from the top and bottom right wing panels even though there was no damage to the strut - need to work on the top right panel and stripe the strut to match the strip going on the left strut to cover the repair
started the repair of the repair of the top left panel - had to go purchase thin CA
continued work on piecing and gluing the motor mount box
Used Titebond to repair the lower, right fairing Maxlok hole reinforcement plywood

glued seams of the cracks in the center top section with Aleene's Original Tacky Glue which appears to be about the same as RC-56 - dries clear and has the same smell
after glue dried removed tape from all parts
finished the motor mount box repair
moved and retightened the main gear wheel collars inside the fuselage
cleaned bottom wing fairings for a better fit
added a little masking tape to the bottom wing rods so they didn't move so easily
bottom wing panels inspected again and found to be okay - then trial fitted to the wing fairings
covering was removed from the wing fairing area on the fuselage - Titebond used to attach fairings - taped in place - more Titebond added into the fairing joint using a syringe once original had dried
repaired top left wing panel root area, with the most damage, and glued the Maxlok tab even gluing to the bottom wing sheeting - the butt joint and joint where it exited the wing was just not secure enough
removed the tape from the lower wing fairings
repaired the top right wing panel and secured the Maxlok key holder piece to the bottom sheeting
Sanded the filler used on the top of the top left wing panel
Measured the 'angle' on the new motor mount due to the box being crooked - abouot 1/8" off
1/16", 3/32" and 1/8" plywood shims were made for use when remounting the motor
Repaired the cowl - fiberglass 'cracks' were painted with Testors gloss black and red, air scoop missing plastic covered with masking tape and painted gloss black, dummy engine glued as well as could be with a lot of missing parts
covered the top and bottom of the top wing repairs with red covering and ironed down some wrinkles in the front of the fuselage
covered the reglued strut joint with a red strip and put a matching stripe on the other strut
attached the aileron and flap extensions the TR624
reinstalled the center section
attached rudder and elevator servos and verified all working correctly using a receiver battery
reattached the struts the bottom panels first and then the tops - a magnet proved very helpful
attached the wing panels and checked all servos for correct throw again
replaced the shaft and prop adapter*
tested power system on the test stand with new prop
reinstalled the battery and ESC
Reinstalled the motor using the 1/16" shim on the right side and a washer under each top leg of the "+" for down thrust
Took plane outside and tested the power system with the fully charged 4S "A123" 2300mAh battery - the numbers were quite different from the original power test - it was a different prop (APC has had various iterations of props labeled the same) and the temperature was about 20-deg C cooler - results of test: 11.12v, 38.1 amps, 7074 RPM and 424 watts in

radio system range tested from different angles - checked okay
replaced batteries in the Tactic TTX650 - just to be sure, although not showing low
attached the cowl
checked the balance - okay

August 16, 2013

plane to the field and photographed with repairs
flown very successfully three times - all flights ended with the plane on its wheels - really nice landings
slight trim change needed on ailerons
more down elevator required
plane climbs quite rapidly with no elevator input at full throttle
most flying done with throttle stick on transmitter just about 1/2

At home
two more washers, for a total of 3, added for more down thrust

replaced the shaft and prop adapter*
That is a simple enough statement. Unfortunately, it was not simple.
When I took the OMA-5010-810 apart I found it to be a very well made product. I've opened up several outrunners in my lifetime, and I've got to say that the engineering and production execution was excellent!
I had a problem replacing the shaft. I broke the metric socket head cap screw on the back of the motor.
(http://www3.towerhobbies.com/cgi-bin/wti0001p?&I=LXCRNB&P=7
Price $4.99 for a single screw)
I tried to loosen it both ways, as I thought it might have reverse threads on it. It would not budge either way and I eventually applied enough force to break the head off the screw.
After I broke the screw, I carefully looked at the threads on the new shaft, and they appeared to me to be 'reverse' threaded.
There were no local sources available to me for the 4x10mm reverse thread screw.
The fix was to tap the shaft for a standard 6-32 thread and use a 6-32 bolt and washer and blue Locktite it in.