TECHNICAL SERVICE BULLETIN: 104686-000 Beechcraft Series 36 Yaw Servo Cable Misalignment, Rev B

Original Bulletin: April 14, 2023

This Document Superseded By: 104750-000 Beechcraft Series 36 Autopilot Servo Update

PLEASE READ THIS BULLETIN IN ITS ENTIRETY BEFORE CONTACTING DYNON AVIONICS

Description

Dynon has received reports of Beechcraft Series 36 aircraft where the yaw servo bridle cable on one side of the capstan is misaligned by a few degrees (see Figure 1). Over time, this misalignment could lead to wear on the capstan's grooves. This technical service bulletin details the fix for the misalignment.

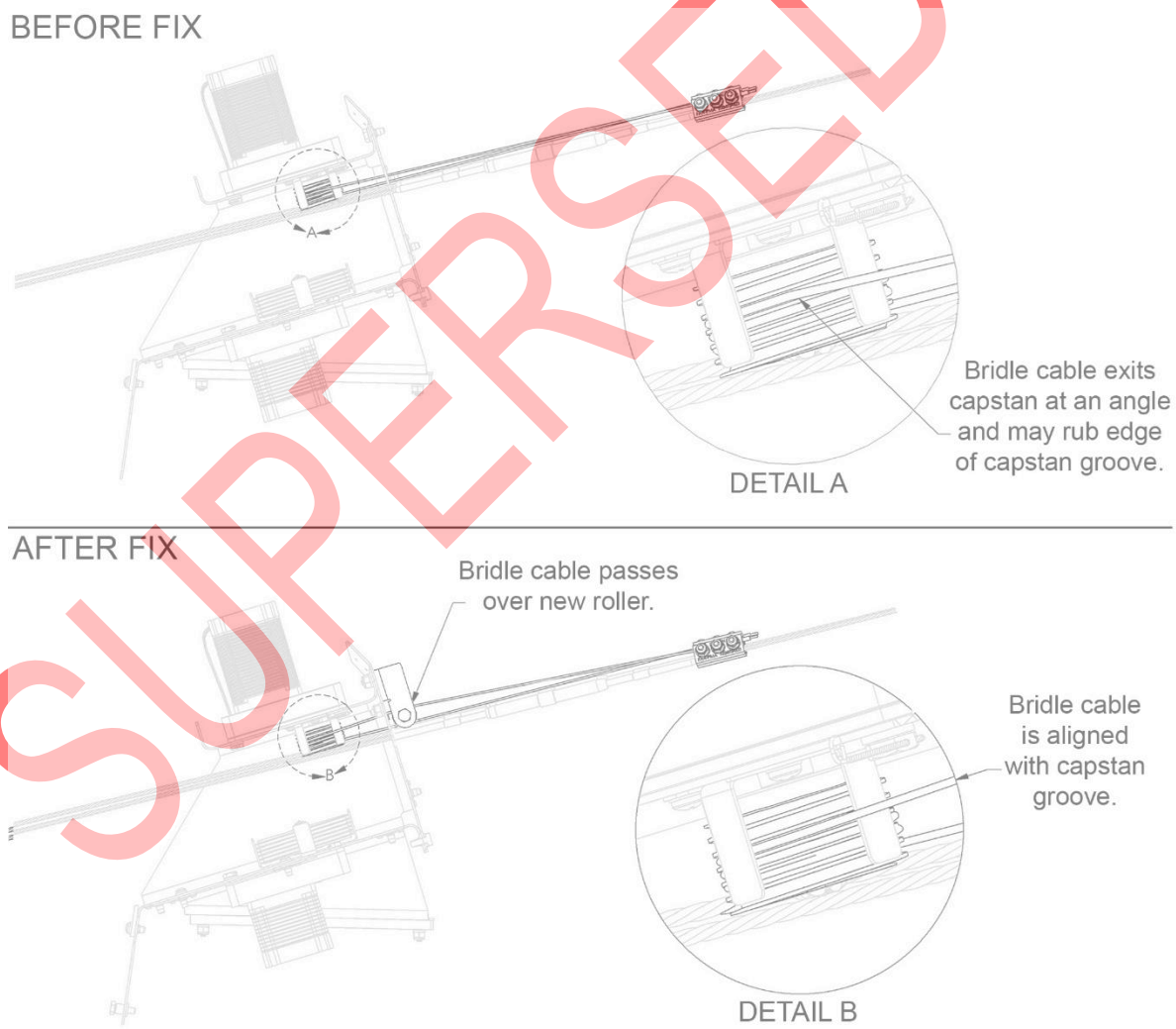

Figure 1: Before and After Implementing Fix

Applicability and Affected Equipment

This bulletin only affects the following certified aircraft models.

- Certified Bonanza 36 models with a yaw servo kit shipped prior to 11/01/2022.

Required Actions

Within 12 months after the effective date of this service bulletin or 100 flight hours, whichever comes first, install the new Dynon-provided parts. To request parts, fill out and submit the following form: Beechcraft Series 36 Yaw Servo Cable Misalignment Request Form.

This action must be performed by an appropriately-rated certified mechanic and must be entered into the aircraft records showing compliance with this service bulletin in accordance with 14 CFR 43.9(a) and the instructions in this service bulletin. The record must be maintained as required by 14 CFR 91.417.

1. Disconnect aircraft power.
2. Access yaw servo and its bracketry by removing the access panel located behind baggage area in accordance with manufacturer's service manual.
3. Disconnect wire harness connector from yaw servo.
4. Loosen cable clamps to disconnect bridle cable from rudder control cables. Leave cable clamps in place.
5. Unfasten bridge bracket and boxing plate assembly (see Figure 2). Keep hardware for re-installation.

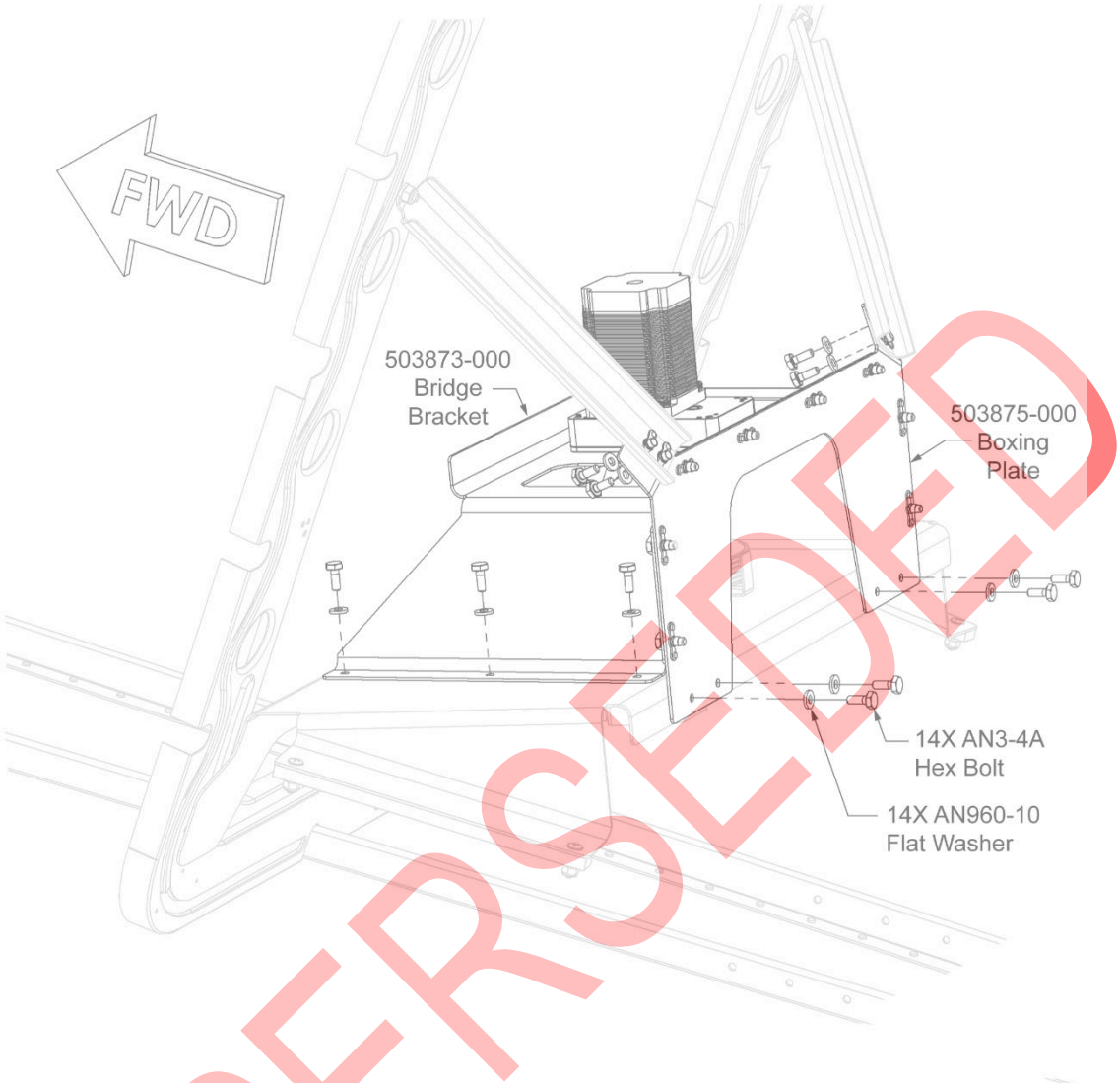

Figure 2: Removing Bridge Bracket and Boxing Plate Assembly from Aircraft

6. Remove bracket assembly, with yaw servo attached, from aircraft.

7. Remove bridle cable and capstan from yaw servo (see Figure 3). *DO NOT loosen or remove the shear screw from the servo disc!*

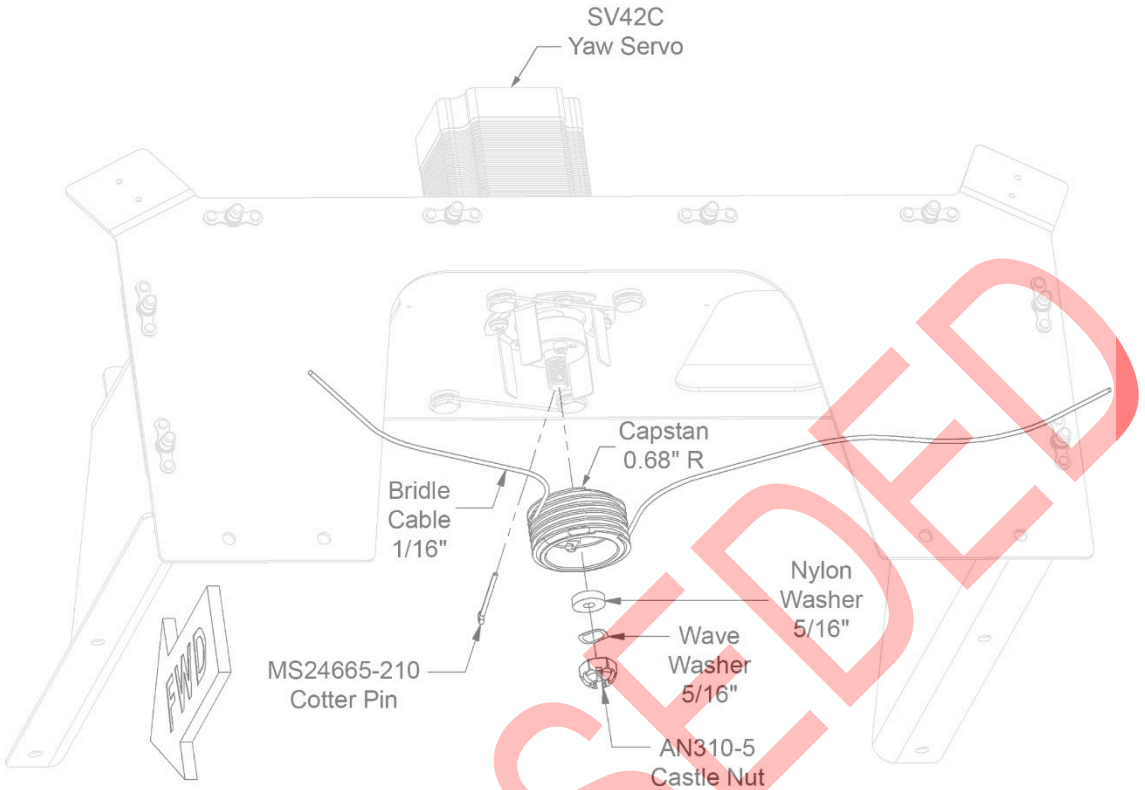

Figure 3: Removing Bridle Cable and Capstan from Yaw Servo

8. On a workbench, drill out rivets and remove nutplate and hardware (see Figure 4).

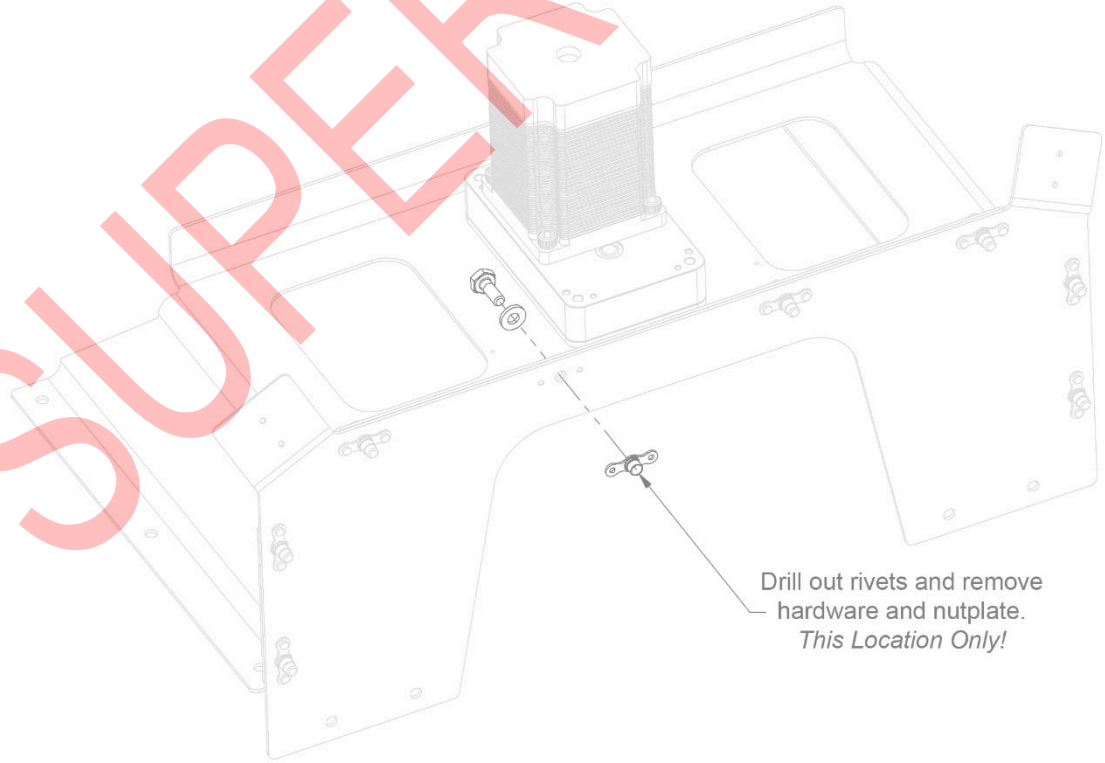

Figure 4: Removing Nutplate from Boxing Plate

9. Position and then clamp roller bracket in place, as shown Figure 5.
10. Match drill up to #10 holes through brackets (see Figure 5).

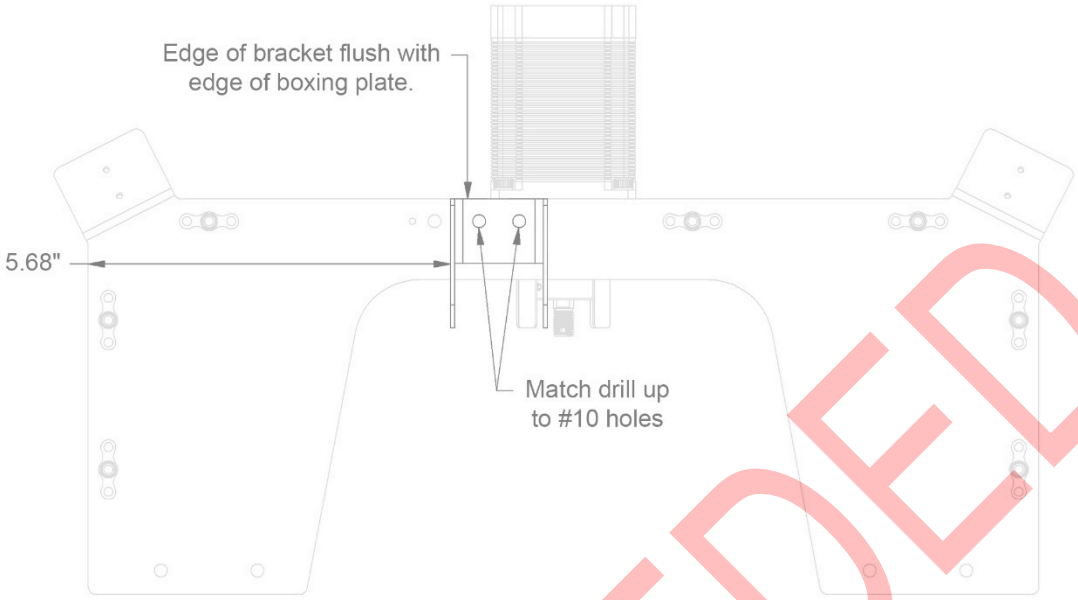

Figure 5: Positioning and Drilling Holes in Brackets

11. Attach roller bracket to bracket assembly (see Figure 6).

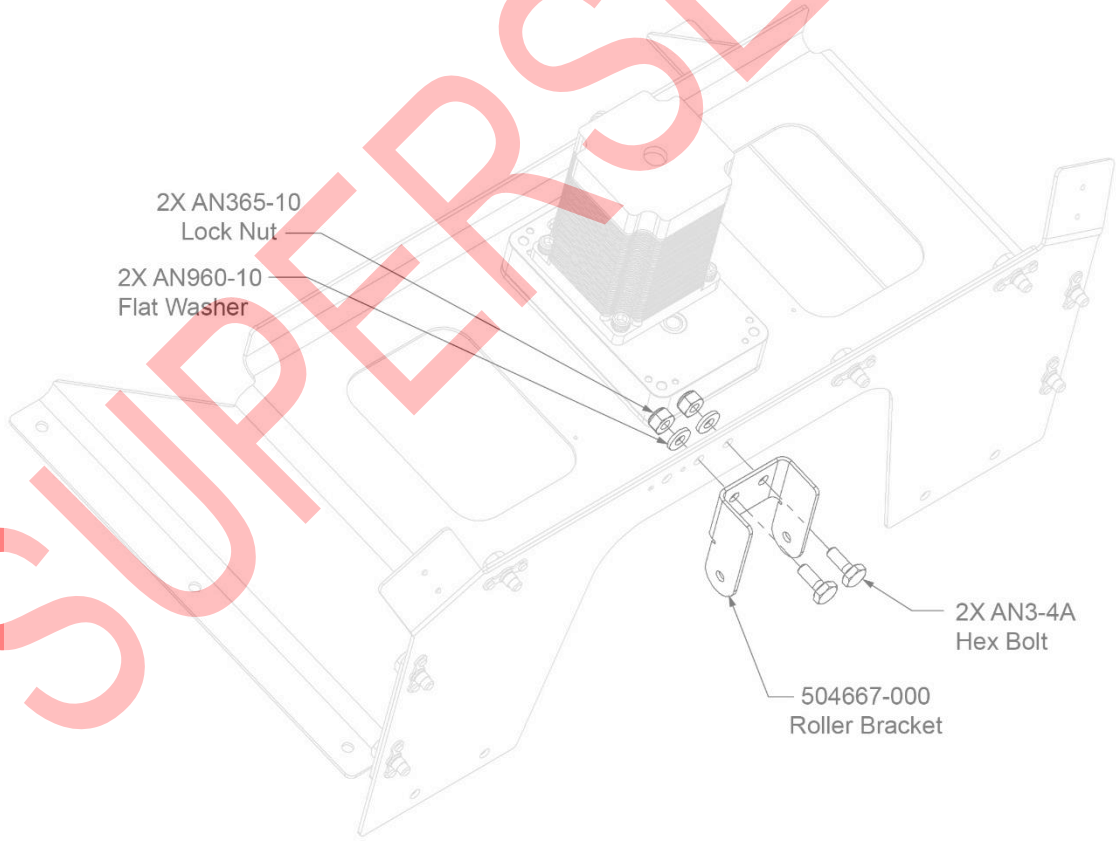

Figure 6: Attaching Roller Bracket to Bracket Assembly

12. Install roller, as shown in Figure 7.

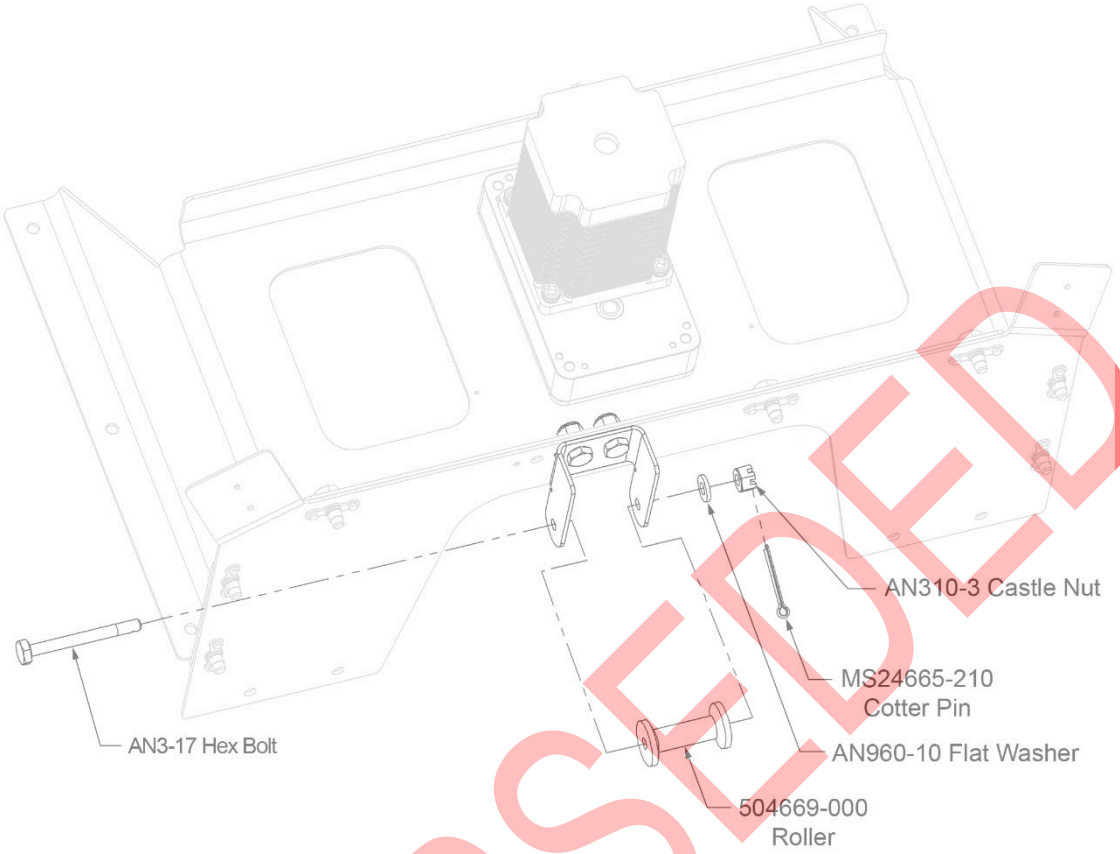

Figure 7: Installing Roller

13. Finger-tighten castle nut onto roller bolt, and then use a wrench to tighten until a slot in castle nut lines up with hole for cotter pin. *DO NOT overtighten the castle nut!*
14. Verify that roller moves freely and use a feeler gauge to ensure a gap between roller and bracket of at least 0.005". *An overtightened castle nut may prevent the roller from moving freely!*

15. Insert swage pin on new bridle cable into new capstan's engagement hole (see Figure 8).
16. Starting from engagement hole, wrap one end of bridle cable clockwise 1-1/4 times around capstan, and then wrap other end of bridle cable counterclockwise 1-1/4 times around capstan (see Figure 8).
17. Secure (e.g., tape) bridle cable to capstan grooves to prevent unraveling.
18. Temporarily attach capstan to yaw servo (see Figure 8). *Do not fully tighten castle nut or insert cotter pin yet.*

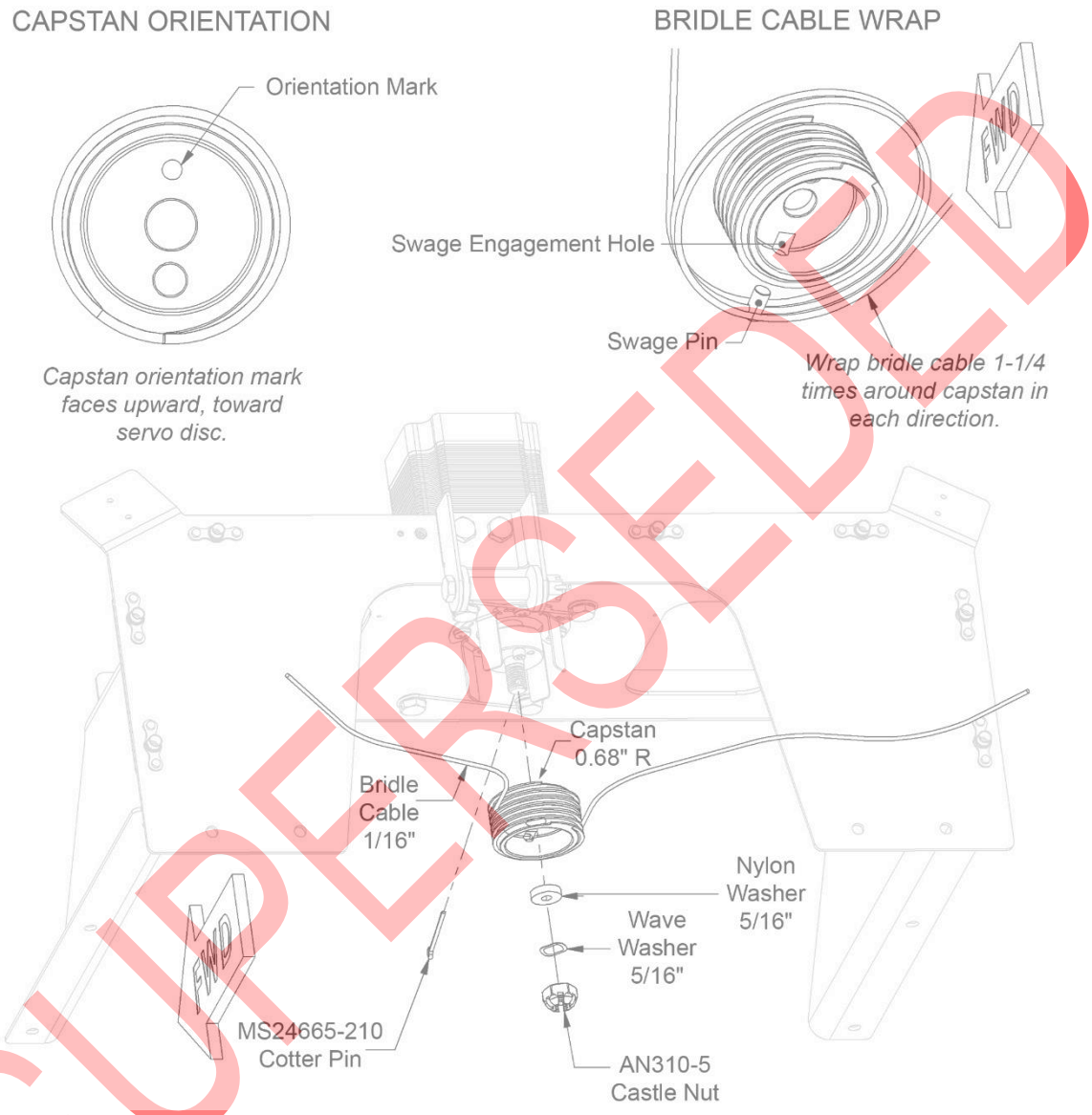

Figure 8: Attaching Capstan with Bridle Cable to Yaw Servo

19. Ensure capstan is positioned so:
    - It is fully seated on servo disc.
    - The orientation mark faces servo disc.
    - The swage engagement hole points forward.
    - The shear screw head is within its hole on the capstan.

20. Re-install bracket assembly with yaw servo (see Figure 9). Torque fasteners per specifications in AC 43.13-1B, Table 7-1.

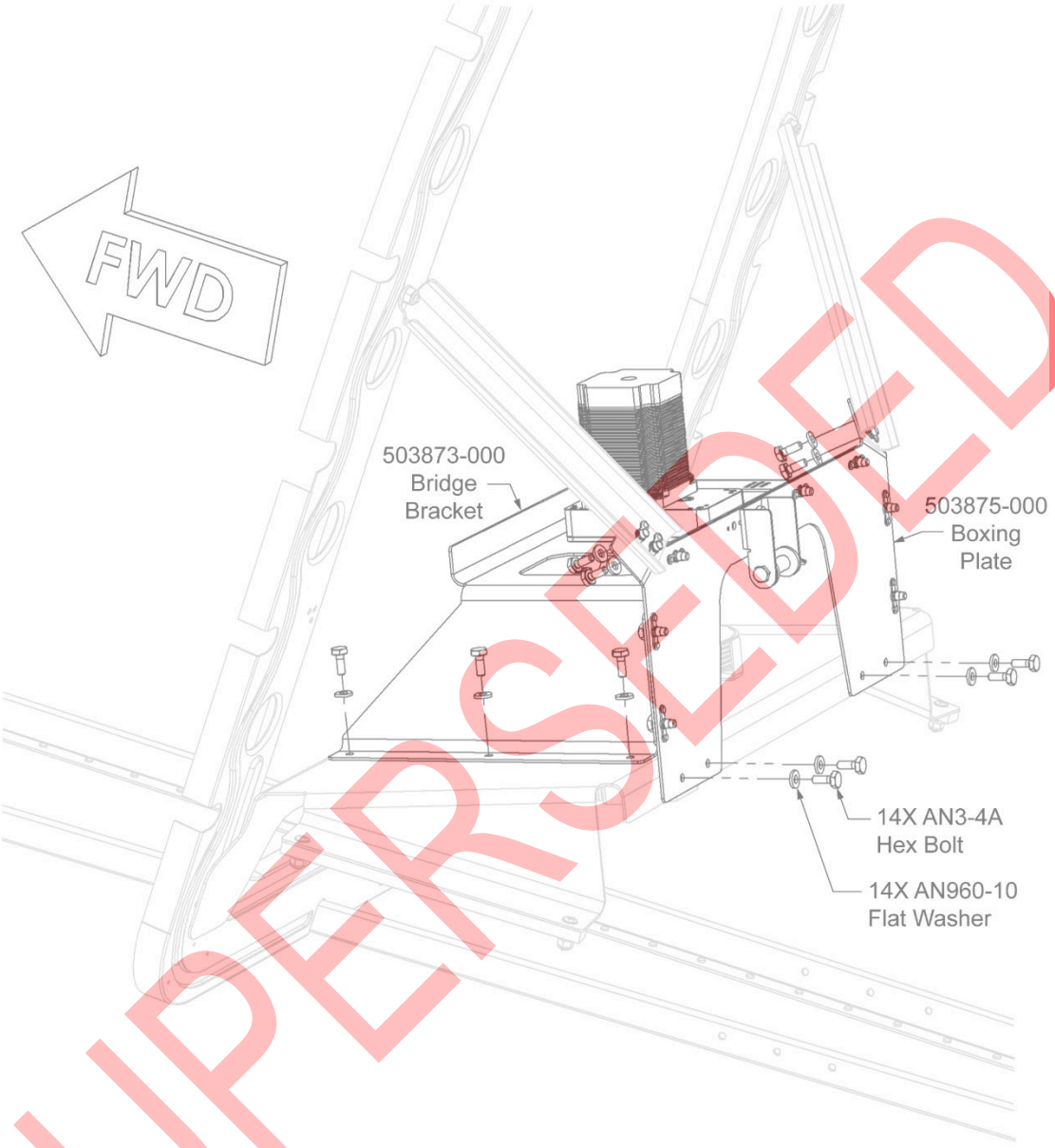

Figure 9: Re-installing Bracket Assembly

21. Secure rudder in neutral position.

22. Connect bridle cable to rudder control cables with cable clamps (see Figure 10). Position bridle cable so it travels over (not under) the roller, as shown in Figure 10. *Do not fully tighten fasteners.*
23. Position bridle cable clamps as shown in Figure 10 and ensure they do not contact any structures.
24. Mark locations for swage stops on bridle cable at outside edges of cable clamps.
25. Remove bridle cable from cable clamps.
26. Slide a swage stop onto one end of bridle cable so it is aligned with mark.
27. Permanently attach swage stop to bridle cable, and then trim bridle cable end flush with outside edge of swage stop. Repeat on the other end of bridle cable.
28. Re-connect bridle cable to rudder control cables with cable clamps (see Figure 10). *Do not fully tighten fasteners.*

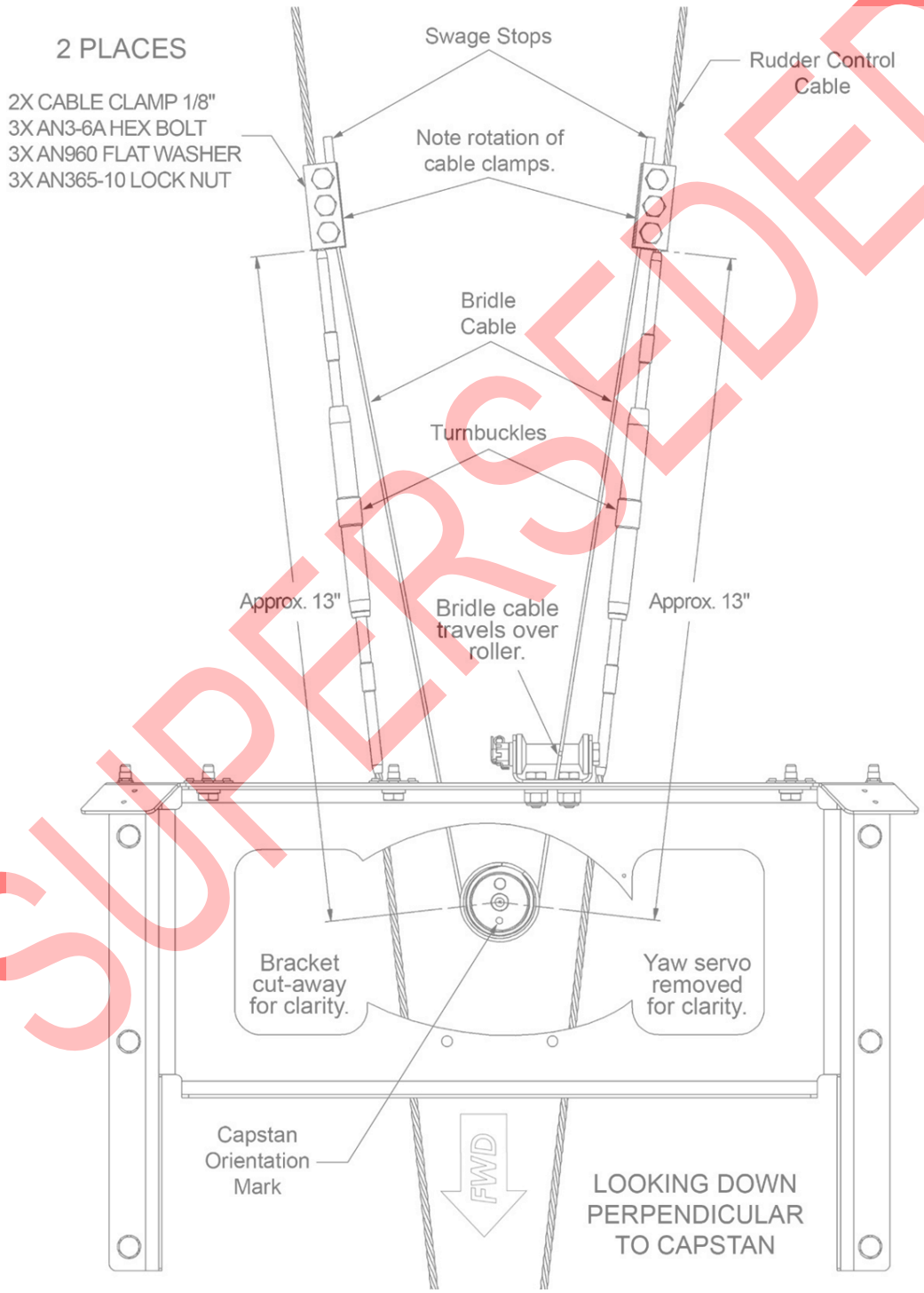

Figure 10: Connecting Yaw Servo Bridle Cable to Rudder Control Cable

29. Ensure bridle cable does not contact cable guard. *Note that the bridle cable will prematurely wear if it contacts the cable guard throughout its travel.*
30. If bridle cable contacts cable guard, adjust cable guard position:
    a) Remove capstan from yaw servo (see Figure 3).
    b) Remove screws and washers that secure capstan guard to servo.
    c) Rotate capstan guard to correct position.
    d) Secure capstan guard to servo with screws and washers.
    e) Re-attach capstan to servo (see Figure 8). *Do not fully tighten castle nut or insert cotter pin yet.*
    f) Ensure capstan is positioned so:
        - It is fully seated on servo disc.
        - The orientation mark faces servo disc.
        - The swage engagement hole points forward.
        - The shear screw head is within its hole on the capstan.
31. Tension and temporarily secure bridle cable to 15–20 lbs, while ensuring the swage engagement hole continues to point forward. *Note that the tension on bridle cable should never exceed the manufacturer's specified tension for the control cable.*
32. When satisfied with bridle cable tension and capstan position, tighten all bridle cable clamp nuts to 35-40 in-lb.
33. Use a feeler gauge to measure gaps between bridle cable clamp halves (top and bottom).
34. Ensure gap measurements on both sides of clamp are not less than 0.003" and not more than 0.050". *Note that out-of-specification bridle cable clamps can slip under load.*
35. If gap measurements do not meet criteria above, measure diameter of control cable, and then contact Dynon Technical Support at dynoncertified.com/contact for a resolution.
36. Use a wrench to permanently tighten castle nut onto yaw servo shaft and secure with cotter pin. *Do not overtighten castle nut! Tightening the castle nut beyond 4 in-lbs may prevent the capstan from rotating freely in event of shear screw failure.*
37. Release rudder.
38. Move rudder control through full range of motion per manufacturer's maintenance instructions, and verify the following:
    - Control is smooth throughout (i.e., no grinding, rubbing, or roughness).
    - Bridle cable clamps do not contact any structures during entire travel.
    - Capstan never rotates more than 150 degrees in either direction from neutral.
39. Cycle the control several times, return it to neutral, and verify the following:
    - Position of bridle cable clamps closely matches Figure 10.
    - Capstan orientation mark is positioned, as shown in Figure 10.
    - Bridle cable tension has not changed.
40. Report compliance of this service bulletin to Dynon Certified Technical Support at dynoncertified.com/contact.

Material Information

Dynon to send Bonanza 36 Yaw Servo Roller Kit (P/N 504654-000) that includes the following parts and hardware:

P/N	QTY	DESCRIPTION
504667-000	1	YAW SERVO ROLLER BRACKET
504669-000	1	YAW SERVO ROLLER
AN3-17	1	HEX BOLT #10-32 X 2" DRILLED SHANK
AN3-4A	2	HEX BOLT #10-32 X 1/2"
AN310-3	1	CASTLE NUT #10-32
MS24665-210	2	COTTER PIN 5/64" X 3/4"
AN960-10	3	FLAT WASHER #10
AN365-1032A	2	LOCK NUT #10-32
103892-000	1	SERVO CAPSTAN 0.68" R
101113-000	1	BRIDLE CABLE 1/16"
101670-000	2	ST2-2 STOP SWAGE, 1/16" CABLE

Time in Effect

N/A - this document has been superseded.

Additional Questions?

Contact Dynon Certified Technical Support at dynoncertified.com/contact.