

March 23, 2013



Steering Systems Program

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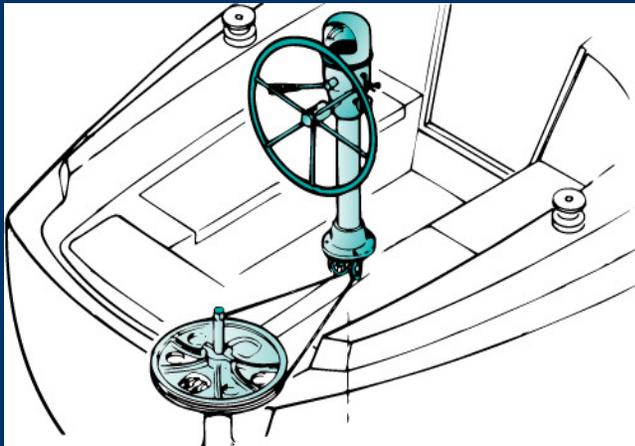
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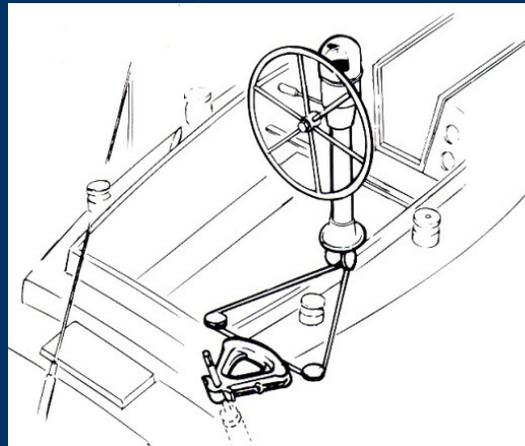
- **Why Maintain your steering system?**
 - **Steering is the Difference Between a Vehicle and a Shelter**
- **What Kind of steering do I have?**
 - **Chain and Wire Systems with Quadrant or Radial Drive**
 - **Conduit Pull-Pull Systems**
 - **Geared Steering**
 - **Hydraulic Steering**
 - **Tiller**



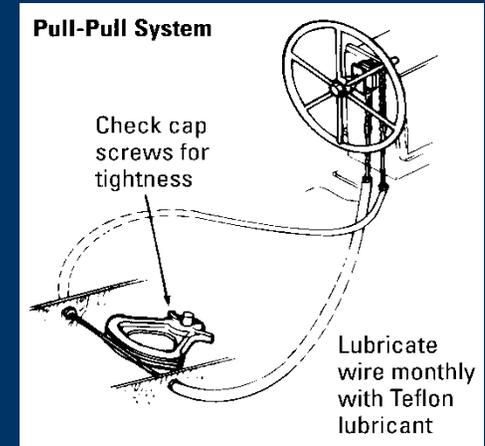
Chain/Wire Systems



Radial Drive



Quadrant



Pull-Pull Conduit



Steering Systems

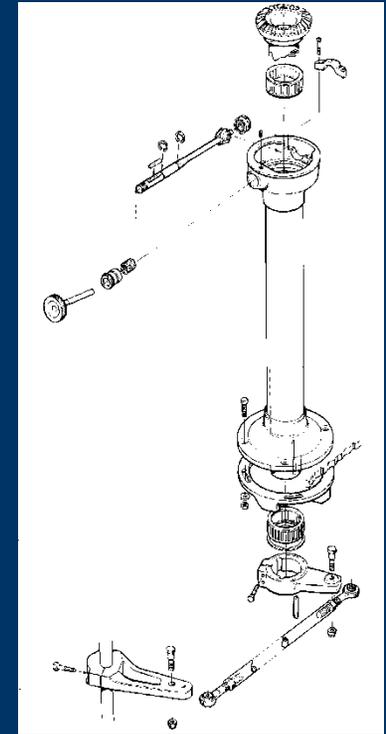
Geared Systems



Rack and Pinion



Worm Gear



Compact



Chain and Wire Steering System Inspection and Maintenance



Steering Compartment Inspection

1. Document and record the system

- a) Photograph existing system**
- b) Print and laminate the photos for reference**

2. Inspect for Chafing

- a) Wipe areas around hardware with white rag**
 - Look for metal flakes
- b) Examine Sheaves**
 - Check for worn (shiny) or sharp edges
- c) Scan wire rope for broken strands**
 - Turn steering wheel to help review entire length



Steering Compartment Inspection

3. Avoid potential hazards

a) Check for possible interferences

- **Could anything get loose and fall into your steering cable?
Even in a knockdown?**

b) Isolate your steering system

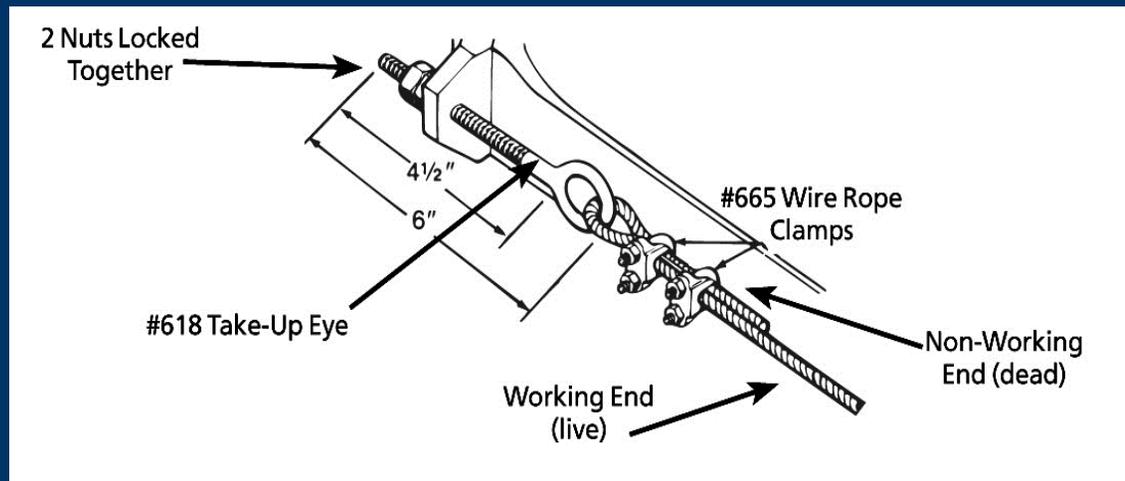
- **Nets, marine plywood, etc.**
- **Must be easily removable for access at sea**



Steering Compartment Inspection

4. Inspect Sheave Pins and Lubricate Bearings

- a) Tighten the wheel brake
- b) Remove the wire take-up eyes from the quadrant or radial drive wheel (there should now be slack in the cables)





Steering Compartment Inspection

- c) Remove sheave pins and inspect for wear**
- d) Replace worn or brass sheave pins**
- e) Clean sheave bushing with WD-40**
- f) Lubricate bushing with #30 motor oil**





Steering Compartment Inspection

5. Inspect Idler Plate (Located below steering pedestal)

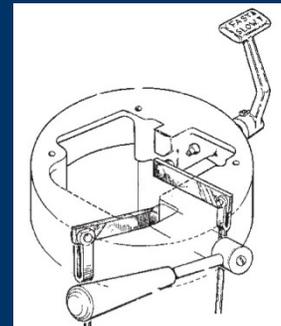
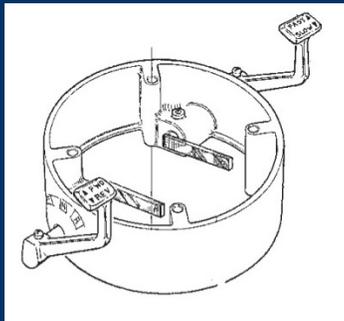
- a) Replace if any signs of rust**
- b) Tap with hammer (it should sound solid)**
 - Dull thud may mean rust on top**
- c) Grab sheave housings and try to move them with your hand (they should feel very secure)**





1. Preparation

- a) **Mark Compass alignment with tape**
 - This will aid in re-installation
- b) **Remove compass**
- c) **Stuff rag into pedestal below the sprocket**
 - This will catch any parts that are dropped
- d) **Remove Engine control**
 - Withdraw cotter pins from control cable ends
 - Take engine control housing off pedestal





2. Survey the Chain

- a) Center the rudder and tighten the wheel brake**
- b) Pull the chain off the sprocket**
- c) Examine chain over full length**
 - Look for signs of rust (especially on the pins and ends)**
 - Check for flexibility of chain**
 - Replace chain every 5-7 years and keep old one on board as a spare (if in acceptable condition)**
 - Replace even more often if your boat has spent time in the Caribbean**



3. Inspect upper portion of wire cable

- **Look for signs of chafe or corrosion**

4. Chain and Wire Rope Replacement (if needed)

- Remove wire rope clamps and take-up eyes**
- Tape messenger line to end of wire rope**
- Mark messenger lines with "Port" and "Starboard"**
- Remove rag from pedestal**
- Pull chain and wire rope through top of pedestal**
- Remove messenger lines from old wire and tape to new wire**



Above Deck Inspection and Maintenance

- g) Pull new wires down through pedestal with messenger lines**
- h) Center the chain on the sprocket**
- i) Re-assemble wire rope clamps and take-up eyes**
 - i. Attach wire rope clamps (do not fully tighten)**
 - ii. Install Wire take-up eyes (one nut and leave extended)**
 - iii. Ensure rudder and chain is centered and brake is on**
 - iv. Remove slack from wire by pulling on tail**
 - v. Tighten wire rope clamps**
 - vi. Repeat for the other side**



Above Deck Inspection and Maintenance

j) Tension the wire take-up eyes

- **5 turns per side at a time (to start)**
- **Cables should be snug, not piano wire tight**
- **The quadrant/radial drive wheel should not be able to move with the brake on**

k) Test the tension

- **Loosen wheel brake and turn wheel hard over**
- **"Lazy cable" should not be able to slip off quadrant**
- **Add more tension if necessary**

l) Install the second take-up eye nuts

m) Check the chain clearance at hard over

- **End should be no closer than 1½" from the sprocket**



5. Lubricate Wheel Shaft Bearings

- **Teflon grease**
- **Use holes on the top of the forward and aft bearing housings**
- **Turn the wheel slowly while applying**

6. Re-install engine control and Compass

- **Remember to use Tef-Gel on the compass bolts**



Additional Thoughts

- **Check your emergency tiller**
 - Does it fit?
 - Is it easily accessed?
 - How well does it handle the boat under sail and power?
- **Test your autopilot**
 - This is your electronic emergency tiller
- **Add an LED light to your steering compartment**

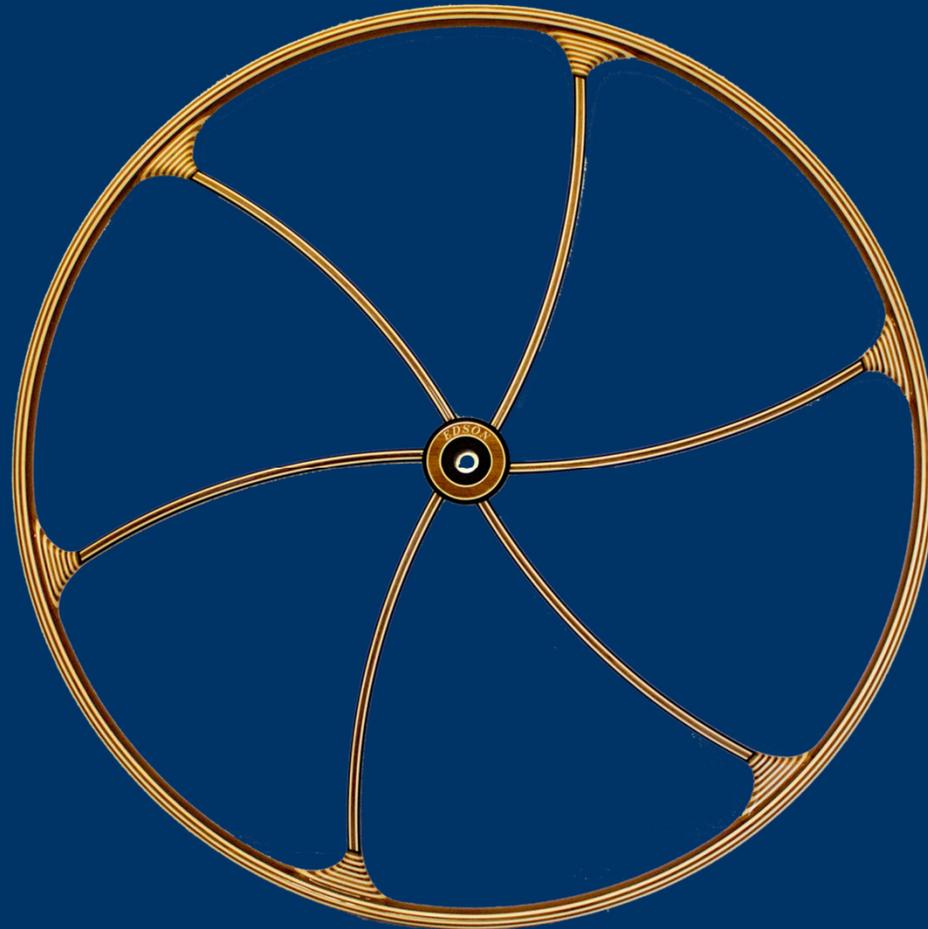


Additional Thoughts

- **Check new steering cables after an initial period for stretch**
 - **Re-tension if needed**
- **Imagine doing all of this at sea at night**
 - **It is much easier done on land or at the dock**



Presentation and Step by Step Guide can be downloaded at edsonmarine.com



Please contact us with any questions on your steering system