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# Steering Systems Program

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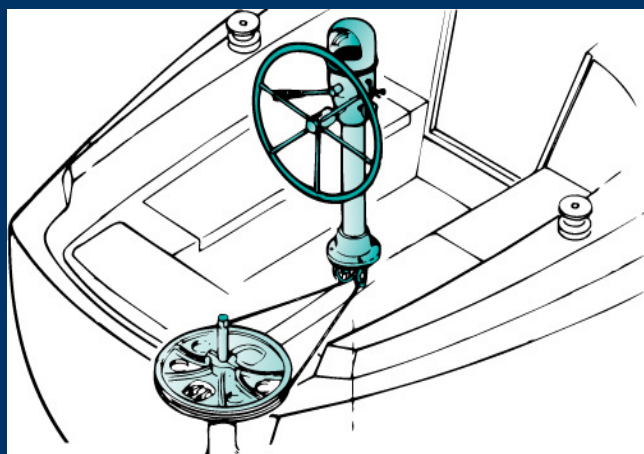
## ***Steering Systems***

- **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**

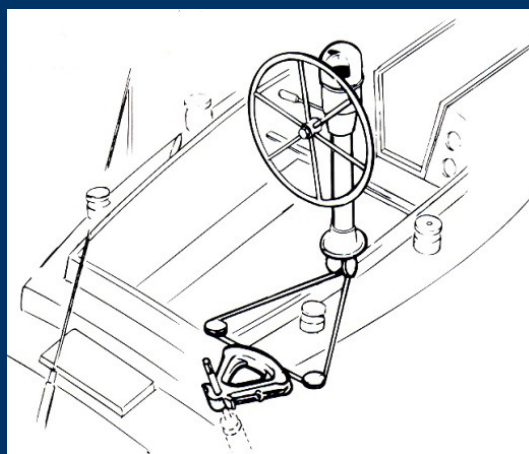


# ***Steering Systems***

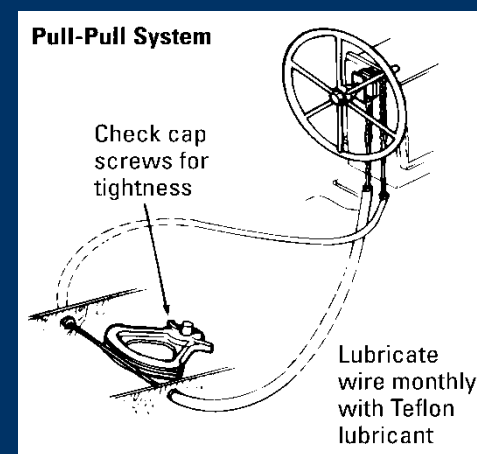
## **Chain/Wire Systems**



**Radial Drive**



**Quadrant**



**Pull-Pull Conduit**



# ***Steering Systems***

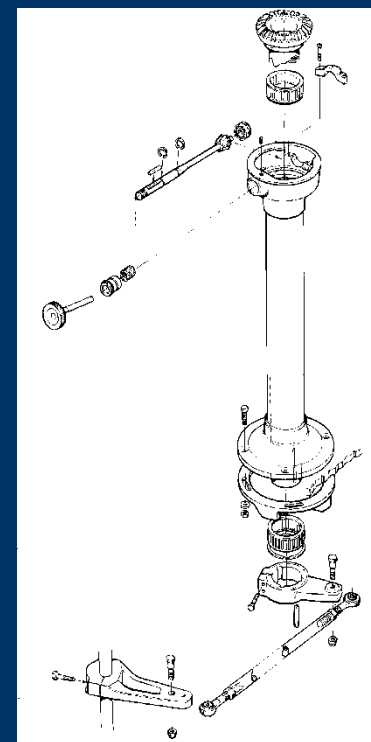
## **Geared Systems**



**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**

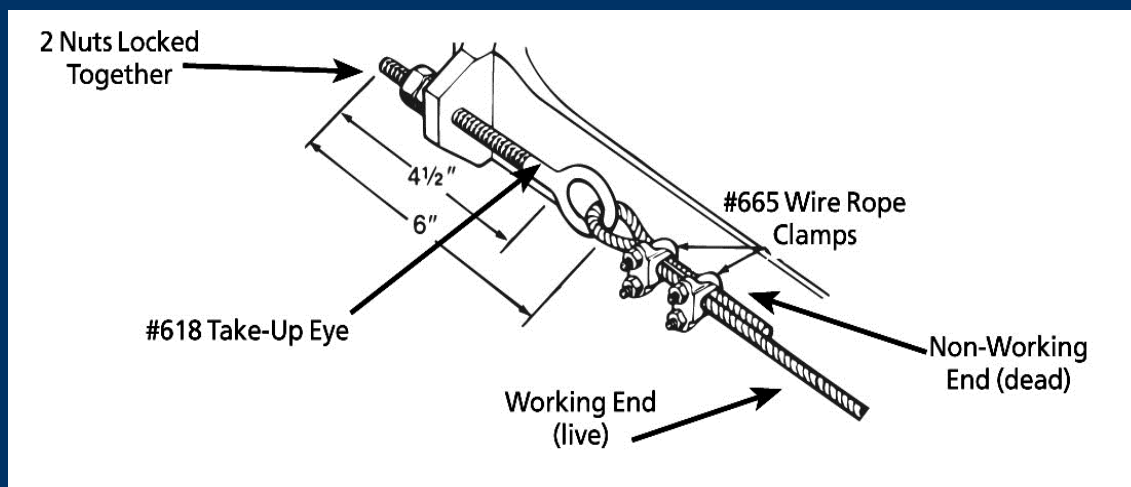
- **Nets, marine plywood, etc.**
- **Must be easily removable for access at sea**



## *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**

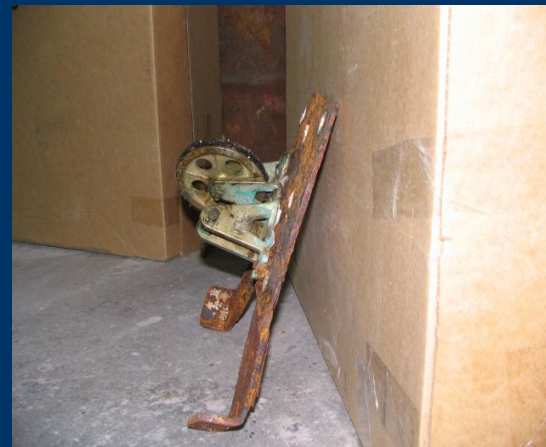




## ***Steering Compartment Inspection***

### **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)**

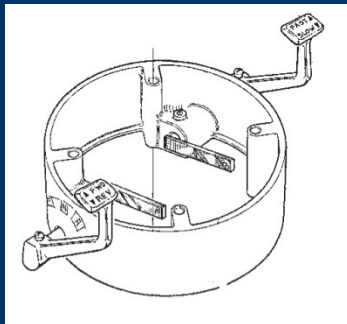




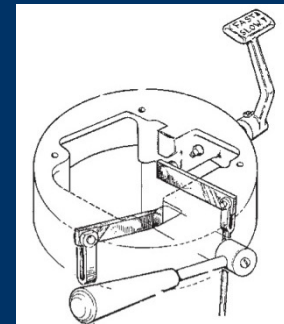
## ***Above Deck Inspection and Maintenance***

### **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



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### **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)**

- a) Remove wire rope clamps and take-up eyes**
- b) Tape messenger line to end of wire rope**
- c) Mark messenger lines with "Port" and "Starboard"**
- d) Remove rag from pedestal**
- e) Pull chain and wire rope through top of pedestal**
- f) 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**

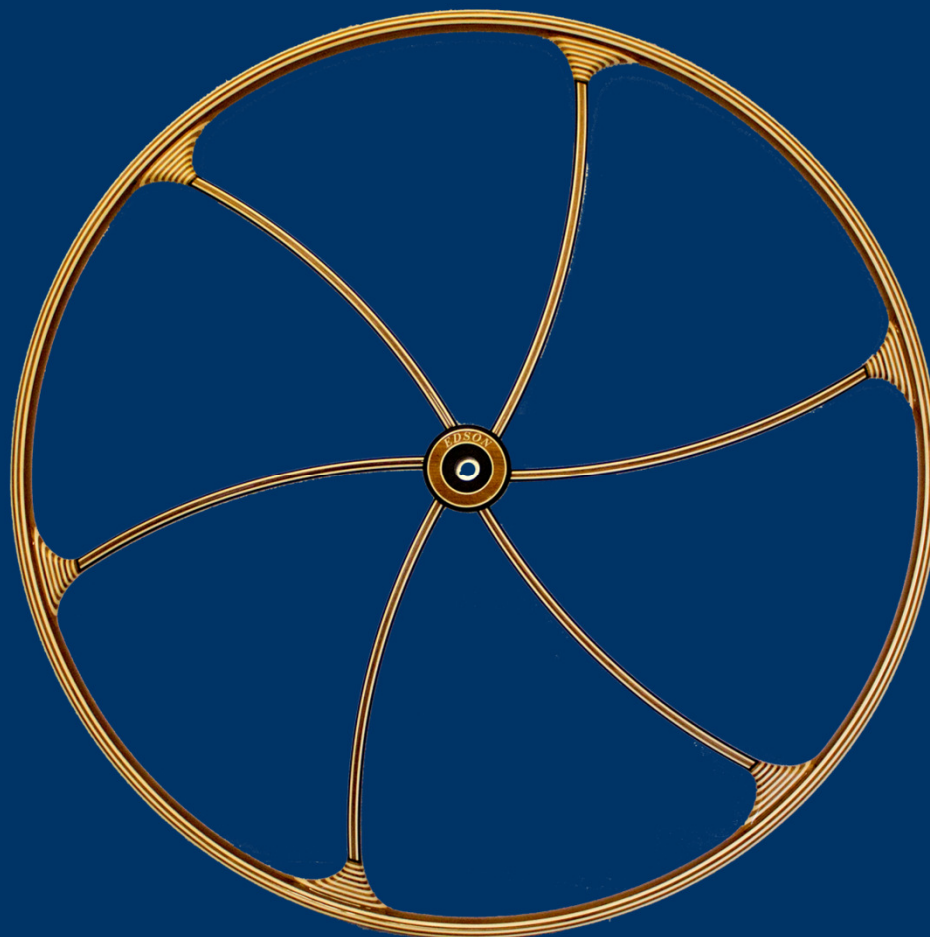


## ***Additional Thoughts***

- **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](http://edsonmarine.com)*



*Please contact us with any questions on your steering system*