Tuneup Process

1. Remove sails and slack all turnbuckles
2. Clean, inspect and lubricate turnbuckle threads
3. Centre masthead side to side, and hand tighten upper shroud turnbuckles
4. Set mask rake; hand tighten headstay and backstay turnbuckles
5. Hand tighten lower shroud turnbuckles
6. Tension headstay, backstay, lower shrouds and upper shrouds (in that order) to ½ spec.
7. Verify mast shape:
    1. Fore and aft curvature
    2. Side to side straightness
    3. Masthead centering
    4. Compensate for deviations
8. Tension headstay, backstay, lower shrouds and upper shrouds (in that order) to ¾ spec.
9. Verify mast shape
10. Tension headstay, backstay, lower shrouds and upper shrouds (in that order) to full spec.
11. Verify mast shape
12. Sea trials

2. Clean Turnbuckles

- Disconnect turnbuckles, one at a time.
    - Ensure that other wires will keep the mast standing.
- Clean stud and body threads with a wire brush and a degreasing solvent. Wipe dry.
- Inspect barrels and studs for cracks:
    - Use 5x magnifier or dye penetrant.
    - Replace if cracks found.
- Lubricate threads:
    - Recommend Lanocote, Tef-Gel or white lithium grease.
- Reconnect turnbuckle

Dye Penetrant

- Used to check for fine cracks not readily visible to the naked eye.
- Visible Dye Penetrant kit consists of three spray cans:
    - Solvent/cleaner
    - Red dye
    - White developer
- Fluorescent Dye Penetrant kit is more sensitive but considerably more expensive.

3 Centre Masthead Side to Side

- Use main halyard weighted with a pail of water.
- Extend halyard and water bucket over lifelines at midships to below toerail.
- Mark halyard at toerail with tape.
- Bring water bucket and halyard to other side of boat and mark with tape at toerail.
- Adjust upper shroud turnbuckles hand tight to eliminate side to side differences in halyard marks.

Mast Rake and Weather Helm

- Weather helm
    - Tendency of a boat to round up to windward
    - Some is desirable but not too much
    - Increases with stronger winds

- Lee helm
  - Tendency of boat to fall off to leeward
  - Generally not desirable
- Mast rake increases weather helm:
  - Mast rake changes weather helm of boat by changing relationship between:
    - Wind pressure on sails at the Combined Centre of Effort (CCE) and
    - Water pressure on hull at the Centre of Lateral Resistance (CLR)
- Were you satisfied with amount of weather helm last time you sailed this boat?

4 Set Mast Rake

- Based on manufacturer's specifications
- Trim boat fore and aft and use plumb bob
- Were you satisfied with amount of weather helm last time you sailed this boat?
- Hand tighten headstay and backstay turnbuckles to achieve desired mast rake.
- If mast step needs adjustment, you may want to call a professional rigger.

5 Hand Tighten Lower Shrouds

- Hand tighten lower shroud turnbuckles
- To increase mast forward curvature at spreaders, tighten lower forward shrouds further, and ease lower aft shrouds.
- To reduce forward curvature, do the opposite.
- You do not want aft curvature...
- Check mast for side to side straightness, and correct with lower shrouds.

6 Tension to ½ Spec.

- Follow boat manufacturer's rigging tension requirements:
  - Lower tension will lower sailing performance.
  - Excess tension can damage equipment.
- Use a tension gauge such as a Loos Gauge.

Mast Shape Key

- Once the masthead is in position with the headstay, backstay and upper shrouds adjusted and lightly tensioned...
- The key to mast shape is the horizontal position of the spreader base.

Shaping the Mast

- Sight up the aft side of your mast and estimate the amount of forward curve at the spreader base.
  - Use the main halyard connected to the gooseneck and hauled tight to form a straight reference line.
- Adjust the lower shroud turnbuckles to obtain your desired mast curve.
  - Count the turns made on each turnbuckle
  - If you increase tension on one side of the boat, reduce tension on the other side by a similar amount.
  - Keep notes of each change made as you progress.
- Sight up the side of your mast again to check the results.
- Check for side to side straightness.

Sea Trials

- Check pointing ability and boat speed close hauled on both tacks.
  - If different, this could imply that masthead is not centred or masthead is falling off to leeward.
- Sight up side of mast under sail to validate mast curve.
  - How does mainsail shape look?
- Sight up front of mast under sail to determine if:
  - Masthead is falling off to leeward.
  - Mast is bowing in the middle to leeward.
- Check that leeward shrouds are not excessively loose.
- Sight up head stay to determine if it is sagging excessively.
  - How does the jib shape look?
  - Any sign of excessive jib leech flutter?
- How is weather helm?