10/30/2020

Wavemaker Maintenance Guide

By Matthias Page

Page, Matthias O
UNH CHASE 185

Intro:

Overview and guide how to complete all necessary maintenance items. Broken into four categories: per-operation, weekly, monthly, and Pre-lab shutdown.

Table of Contents:

Per-Operation Maintenance:

Perform prior to plugging in wavemaker

1. Check belt tension
    a. Check belt is sufficiently taught (should deflect a maximum of ½" when pressed)
    b. Ensure black idler is tight
    c. Ensure White idler is tight
    {insert media}

2. Check rotary encoder engagement
    a. Check that rotary encoder pulley is contacting the belt
    b. Manually move wedge up and down to check that the pulley tracks without skipping
    {insert media}

3. Check wiring connections
    a. Ensure no jumper wires have detached from Arduino
    b. Check that all ribbon cables are firmly attached to breakout board
    c. Check limit switch wiring
    {insert media}

4. Check frame alignment to tank
    a. Manually move wedge up and down within tank to check for collisions
    {insert media}

5. Ensure switches are triggering
    a. Manually move wedge to top limit
    b. Listen for top switch to click crisply
    c. Manually move wedge to bottom limit
    d. Listen for bottom switch to click crisply

{insert media}

6. Check panic button is working
    a. Plug in wavemaker
    b. Twist panic button
    c. Check that the wedge cannot be easily moved manually
    d. Press panic button firmly
    e. After brief delay ensure wedge can now move freely
    f. If wedge remains firmly in place after panic switch is pressed do not operate wavemaker

{insert media}

Weekly Maintenance

Remove wavemaker from tank prior to maintenance

1. Recoating Wedge [TREAT WEDGE]:
    a. Spray light coat of white lithium grease onto a paper towel
    b. Wipe paper towel over wedge surface
    c. Buff wedge surface with paper towel until grease splotches are no longer visible
    {insert media}

2. Cleaning test tank water [CLEAN WATER]:
    Note: Only compete as needed
    a. Drain old water from tank
    b. Refill with new water
    c. Add treatment media

3. Lubricating linear rails and axels [LUBRICATE RAILS & AXLES]
    a. Ensure wavemaker is powered off
    b. Move wedge to bottom limit
    c. Spray light coat of white lithium grease into rails above wedge
    d. Moe wedge to top of movement
    e. Spray light coat of white lithium grease into rails below wedge
    f. Wipe away excess with paper towel
    g. Use excess to gently lubricate top and bottom axle bearing points
    {insert media}

4. Ensure tight seal between wedge and sled [CHECK WEDGE SEAL]
    a. Check that wingnuts inside wedge are finger-tight
    b. Ensure O-rings are properly squished
    c. Check for any cracks in wedge acrylic
    {insert media}

Monthly Maintenance:

Remove wavemaker from tank prior to maintenance

1. Check all fasteners are still tight [CHECK ALL FASTENERS]
    a. Use 5/32 Allen to ensure all frame brackets are tight
    b. Use 5/32 Allen to ensure axle bearings are right
    c. Use fingers to gently ensure wedge fasteners are all tight
    d. Use 7/16 socket to ensure electronics sled is tight
    e. Use {GET MEASUREMENT} to ensure motor bracket is tight
    f. Use Philips screwdriver to ensure limit brackets are tight

2. Check that linear rails are parallel [CHECK RAIL PARALLEL]
    a. Use calipers to measure top rail spacing
    b. Use calipers to measure bottom rail spacing
    c. If necessary, loosen frame brace wingnuts and adjust top/bottom spacing
    d. Repeat until rails are parallel
    {insert media}

3. Clean belt and idlers [CLEAN BELT & IDLERS]
    a. Loosen black idler
    b. Disengage belt from pulleys
    c. Use damp towelette to wipe down pulley
    d. Wipe down pulleys and idlers
    e. Reengage belt
    f. Tension Belt
    {insert media}

4. Check various points for excessive wear [CHECK PARTS FOR WEAR]
    a. Check linear slides, rotary encoder pulley, lower limit trigger, and idlers
    {insert media}

Pre-Lab Shutdown Maintenance:

1. Remove tension from drive system [SLACKEN BELT]
    a. Loosen black idler
    b. Ensure belt is loose
    {insert media}

2. Dry wavemaker and store it for future use [DRY & STORE]
    a. Use paper towels to wide standing water from wavemaker surface
    b. If available use pressurized air to dry thoroughly
    c. Depress panic button
    d. If necessary remove wedge
        i. Loosen wingnuts inside wedge completely
        ii. Pull wedge from sled
        iii. Place all loose hardware inside a zip-lock inside the wedge
        iv. Ensure no O-rings have been misplaced
    e. Coil cord loosely around frame
    f. Store in upright position do not store resting on wedge or power supply unit
    {insert media}