

Keeping Things Running

Preventative Maintenance



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Preventative Maintenance

“The act of fixing something before it breaks”

Planning

Facility Inspections

Budgeting

Scheduling

Group Discussion:

Maintenance Techniques

Why Do Preventative Maintenance ?

- Marine facilities are costly to build and generally require more maintenance than other facilities.
- Marine environment causes accelerated wear & tear
- Often wear & tear goes undetected (underwater)
- Generally more susceptible to damage from:
 - Weather
 - Corrosive environment
 - Users
- Don't wait for it to break, cause injury, or excessive damage before you fix it.

A Good Preventative Maintenance Program:

- ✓ Reduces risk/ liability
- ✓ Helps prevent loss or major damage
- ✓ Increases life of facilities
- ✓ Protects your investment
- ✓ Keeps long-term maintenance costs down
- ✓ Minimizes down time and lost revenue

Develop Long-term Maintenance & Replacement Plan

- ✓ Helps finance people prepare for future expense
- ✓ Keeps your community & leaders informed
- ✓ Allows for more scheduling flexibility
- ✓ Improves funding opportunities
- ✓ Keeps costs down

Maintenance Planning

Maintenance can generally be grouped into two categories:

■ Scheduled

- Planned major repairs
- Required service, inspection or certification
- Completing deferred maintenance

■ Unscheduled

- Safety issues (Needs immediate attention)
- Damage control

Create a Maintenance task List

- Use Wall Calendar
- Notebook or journal
- Computer maintenance program
- Master Periodic Inspection-task list.doc

Maintenance Planning

■ STEP 1-Inventory your Assets:

- ✓ Docks
- ✓ Piers
- ✓ Floats
- ✓ Grids
- ✓ Buildings
- ✓ Launch ramps
- ✓ Dry Stack
- ✓ Upland
- ✓ Parking Areas
- ✓ Haul out facilities
- ✓ Fueling facilities
- ✓ Breakwaters
- ✓ Floating attenuators
- ✓ Bulkheads
- ✓ Equipment

Maintenance Planning

- STEP 2-Gather info for each facility:

- ✓ Design drawings
- ✓ Specifications
- ✓ Maintenance history
- ✓ Previous inspection reports
- ✓ Maps
- ✓ Photos

Maintenance Planning

- STEP 3-Create inspection checklists:
 - ✓ Method of mapping and documenting findings
 - ✓ Field diagrams
 - ✓ Itemized components
 - ✓ Use field codes and a grading system
 - ✓ Take photos
 - ✓ Keep it simple
 - ✓ Use waterproof paper

Checklist Items



Gangways:

- ✓ Decking- fastenings, nonskid, deck secure
- ✓ Rails- sound, smooth
- ✓ Cord members, weld or bolt condition
- ✓ Fixed end fastenings- hinges
- ✓ Rolling end- freedom of roll, condition of roller & wheels, guides
- ✓ Transition plate- smooth, secure
- ✓ Cables & pipes hanging from gangway
- ✓ Lateral movement- sideways
- ✓ Covering- secure, water tight
- ✓ Signage, lighting

Gangway Inspection Checklist

[illegible]

Facility Inspections

- STEP 4- Conduct facility inspections
 - ✓ Should be part of the daily routine
 - ✓ More detailed inspections should be done semi annually or annually (by qualified staff)
 - ✓ Professional inspection: every 3 to 5 years or as required.
 - By: engineers, electricians, divers, etc.
 - For: certification, calibration, load ratings...

Reporting & Documentation

- Provide staff with the tools to report & document damage:
 - ✓ Inspection checklists
 - ✓ Activity logs
 - ✓ Accident reports
 - ✓ Incident report forms
 - ✓ Hazard reports
 - ✓ Use Outlook

Follow Through

- STEP 5-Make sure the repairs get done!
 - ✓ Compile inspection data
 - ✓ Generate final report & recommendations
 - ✓ Conduct repairs in- house or
 - ✓ Develop a project for Contractor
 - Budget considerations?
 - Define scope of work
 - Prep bid documents
 - Get bids (unit prices)
 - Schedule work
 - ✓ Document completion of work

Maintenance Budget

■ Funding sources:

- ✓ From operating revenue
- ✓ Community development funds
- ✓ Bonds, loans, etc..
- ✓ Grants
- ✓ Reimbursement for damages
- ✓ Other?



Scheduling

- Scheduling Considerations:
 - ✓ Construction season
 - ✓ Contractor/ material availability
 - ✓ User disruption/ busy season
 - ✓ Environmental window/ permit restrictions
 - ✓ Lost revenue/ down time
 - ✓ funding

Maintenance Techniques

Group discussion: What's your biggest maintenance issues?

- Concrete floats
- Wood floats
- Electrical
- Docks & Piers
- Other?



Concrete Float Repair

- ❑ Decking
- ❑ Bull rails
- ❑ Whalers
- ❑ Through rods
- ❑ Floatation
- ❑ Cleats/ bollards
- ❑ Pile collars
- ❑ Connection hardware
- ❑ Fenders
- ❑ Utilities
- ❑ signage

Crack repair

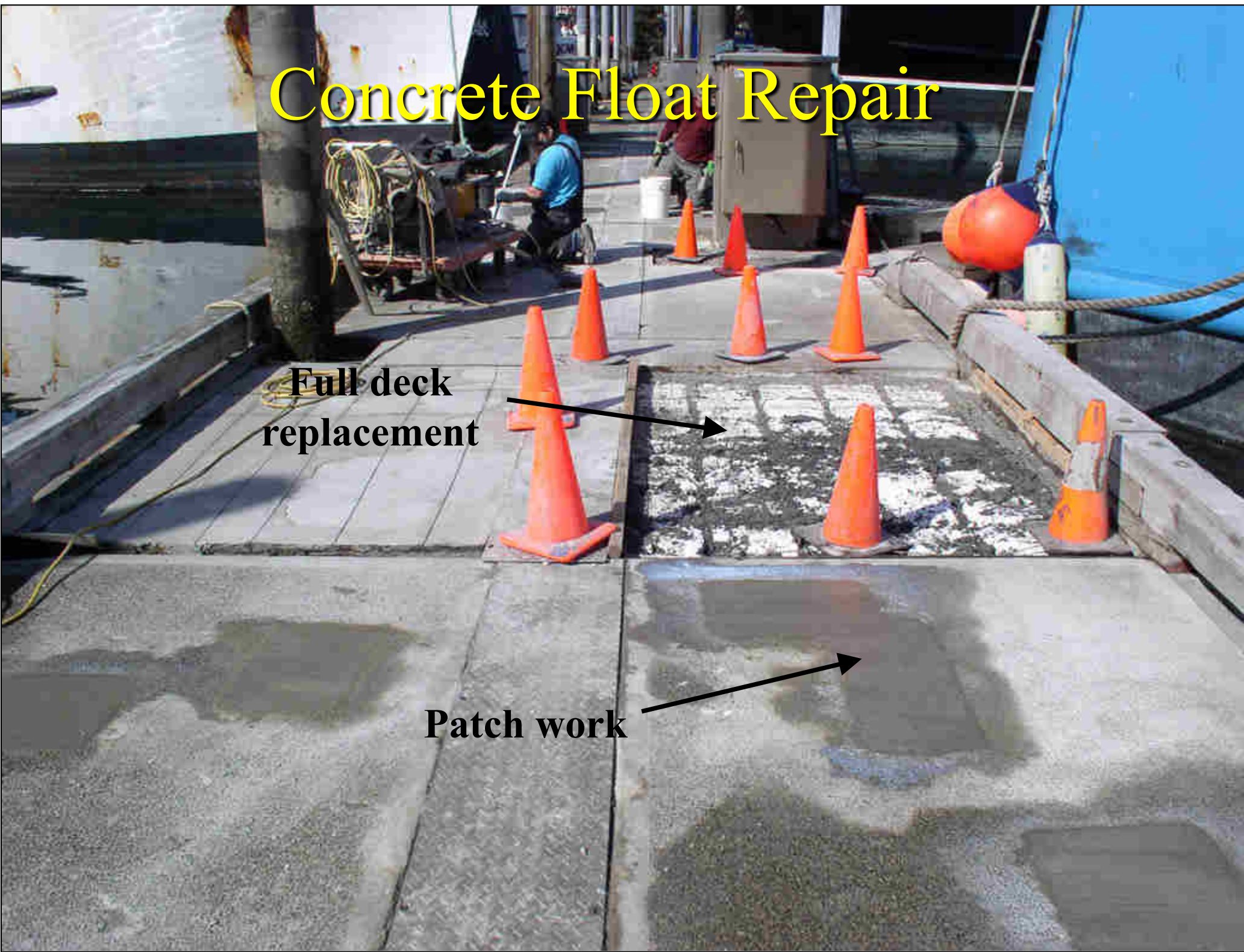
Top coats



Concrete Float Repair

**Full deck
replacement**

Patch work

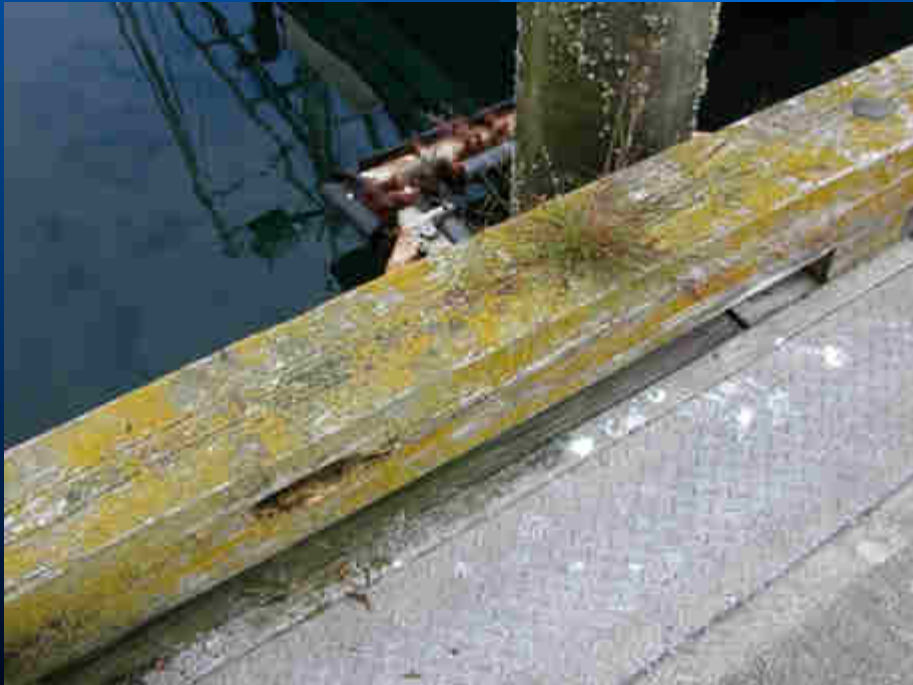


Float Decks

- Concrete deck problems



Cleat & Bullrails



Float units attachment

- Pile hoops



Float to float connections

- Timber walers



Float to float connections

- Timber walers
- Low Freeboard



Wood Float Repair

- ❑ Decking
- ❑ Bull rails
- ❑ Whalers
- ❑ Floatation
- ❑ Cleats/ bollards
- ❑ Pile collars/ piling
- ❑ Connection hardware
- ❑ Fenders
- ❑ Utilities
- ❑ signage



Electrical

- ❑ Power pedestals
- ❑ Metering
- ❑ Receptacles
- ❑ Circuit breakers
- ❑ Main panels
- ❑ Sub panels
- ❑ Lighting
- ❑ Polarity
- ❑ Ground fault detection
- ❑ Feed wiring
- ❑ Vault covers



Docks & Piers



- ❑ Decking
- ❑ Railings
- ❑ Piling/ caps/ stringers
- ❑ Diagonal bracing
- ❑ Load rating
- ❑ Fenders
- ❑ Utilities
- ❑ Fuel systems
- ❑ Lighting
- ❑ Signage
- ❑ Security

Docks & Piers

- Structural evaluations
- Load Ratings



Destructive Inspection

- Stringer rot



Stages of Pile Damage

- Worn piles



Timber Piles

- Worn piles



Reference Materials & Information Sources

- Marinas & Small Craft Harbors, 2nd Addition
By: Bruce O. Tobiasson P.E & Ronald C. Kollmeyer, Ph.D.
- Northern Harbors & Small Ports, Operation and Maintenance, By: Alan Sorum
- PND Engineers, Inc. Kodiak Harbors Facility Condition Report, Jon Keiser

USE PCC NET!