Brunswick Recreational Boat Group

Solutions to Common Safety Issues
at
Boat Building Plants

BAYLINER® MERIDIAN™ YACHTS Sea Ray

Presented By

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Brunswick Recreational Boat Group

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Business Plan

2008 Business Plan
Knoxville Facility

The Vision
To Create a Safe, Secure, and Enjoyable Work Environment by Enhancing our Position as the Ultimate Outdoor Leisure Choice for Sport Cruisers

Safety Policy
"Sea Ray Boats is committed to fostering an environmentally sound and safe work environment for our employees, visitors, contractors and community through education, management commitment, self-empowerment, and continuous process improvements."

Quality Policy
"Sea Ray Boats of Knoxville is committed to building outstanding quality in fiberglass boats through People Achieving Customer Expectations and continuous improvement of the Quality Management System"

Values
Customer Enthusiasm (Internal & External)
Trust & Respect for all Individuals
Teamwork & Cooperation
Continuous Improvement in Everything We Do

2007 GOALS & INITIATIVES
(red = facility bonus performance metric)

ENVIRONMENTAL, HEALTH & SAFETY

Goals:
1. ZERO Lost Time and OSHA Recordable Incidents
2. ZERO Incidents that Result in Restricted Work Days
3. Achieve Level 3 Compliance on the Entire Safe Management System (SMS) Element Portfolio
4. Achieve Safety Super Bonus Threshold of 2,000,000 Man Hours Without a Lost Time Accident
5. ZERO Workers Compensation Claims and Expense
6. ZERO Safety Violations from Internal and External Inspections
7. ZERO Regulatory Fines
8. Housekeeping to SMS Score of 90 or Greater in all Departments
9. Sustain MACT (Maximum Achievable Control Technology) Compliance

Initiatives:
1. Utilize STOP Program to Eliminate Unsafe Behaviors and Conditions
2. Maintain the Interdependent Stage of the Safety Journey for the Facility and Embrace the "Brother Keeper" Philosophy
3. Report and Eliminate 100% of Near Miss Accidents
4. Perform Job Hazard Analysis (JHA) Regimen on all Recordable Accidents or Significant Near Misses
5. Maintain 100% of Employees Trained in STOP
6. Implement Ergonomic Process Improvement
7. Improved Training for All Employees via New Employee Orientation, Monthly Financial Meetings, Weekly Supervisor Training, Weekly Meeting Agenda Sessions, and Central Safety Committee Training
8. Maintain Frequency of Daily Stretching Program

QUALITY

Goals:
1. Achieve Warranty [redacted]
2. Achieve First Time Throughput [redacted]
3. Reduce Internal Defects [redacted]
4. Reduce Warranty Failures [redacted]
5. [redacted]
6. [redacted]

Initiatives:
1. Improve Quality and Value of Finished Product by Ensuring 100% Post Finish Audit Regimen
2. [redacted]
3. Actively Promote the PACE Program as Knoxville Official Methodology for Translating Employee Suggestions Into Action
4. Further Develop Product Line Management Teams to Promote Faster Reaction to our Customers' Concerns
5. [redacted]

CUSTOMERS

Goals:
1. [redacted]
2. [redacted]
3. Maintain and Enhance Relationships with our Dealer Network [redacted]

Initiatives:
1. Proactively Respond to Dealer Concerns [redacted]
2. [redacted]

PRODUCTS & PROCESSES

Goals:
1. Achieve 100% Production Schedule Attainment (Actual Finishes vs. Schedule)
2. ZERO AB9 Quality Management System Audit Finding (Achieve Recertification)

Initiatives:
1. Incorporate Lean Six Sigma Principles into the Business
2. Continuously Evaluate and Integrate Innovative Processes When Available, Cost Effective, and Appropriate
3. [redacted]
4. [redacted]
5. Increase Use of Formalized Action Plans Through PACE Project Teams
6. Continuously Evaluate the Safety of our Products Processes
7. Utilize Supplier and Internal Audits to Continually Improve our Products and Processes

COST REDUCTION / FINANCIAL

Goals:
1. Achieve Annual Operating Margin [redacted]
2. Achieve Raw Material Savings [redacted]
3. Achieve Facility Wide Labor Efficiency [redacted]
4. Reduce Indirect Spending [redacted]
5. Achieve Working Capital Budget [redacted]
6. Reduce Raw Material Production Damages [redacted]

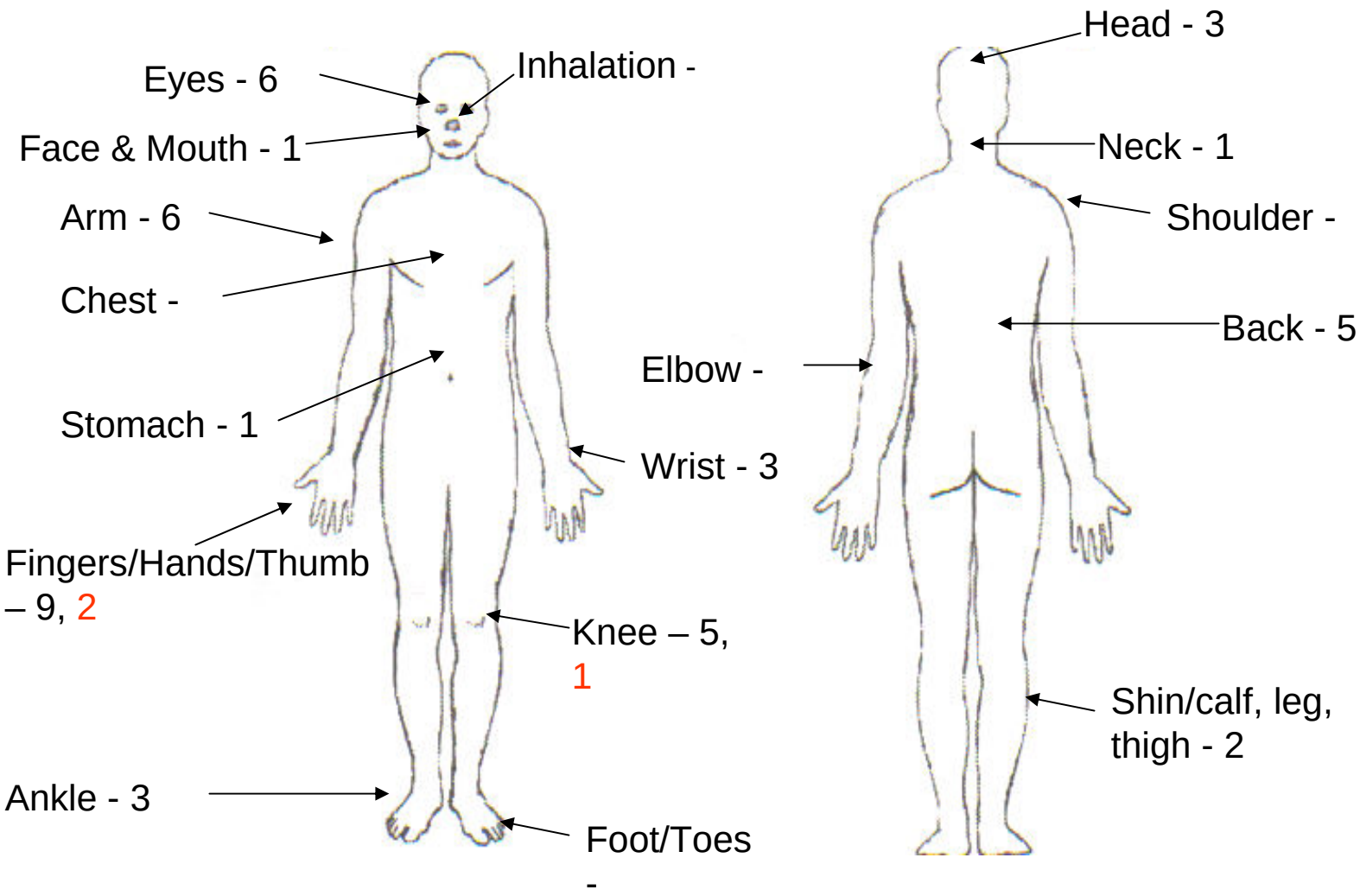
Initiatives:
1. Achieve Facility and Departmental Cost Reduction Action Plans
2. Fully Utilize MP2 to Enhance Predictive Maintenance Mitigating the Effects of Costly Machine Downtime
3. Actively Promote the PACE Program as Knoxville Official Methodology for Translating Employee Suggestions Into Action
4. Utilize Lean Six Sigma Projects and Problem Solving Regimen Where Appropriate
5. [redacted]
6. [redacted]

PEOPLE

Goals:
1. [redacted]
2. Ensure 100% of Employees are Actively Involved in PACE Program (Implemented Suggestions & Teams)
3. Improve Employee Survey Core Categories Score [redacted]

Initiatives:
1. Consistency and Fairness in Administration of Company Policies
2. [redacted]
3. Improve Employee Morale and Work Environment by Developing and Implementing Action Plans Based on Employee Surveys
4. Further Refinement of Employee Orientation Program
5. [redacted]
6. Continuously Improve Education of Employees Through AWS Certification Training, Cross Training, Lean Six Sigma Training, and Educational Assistance Program

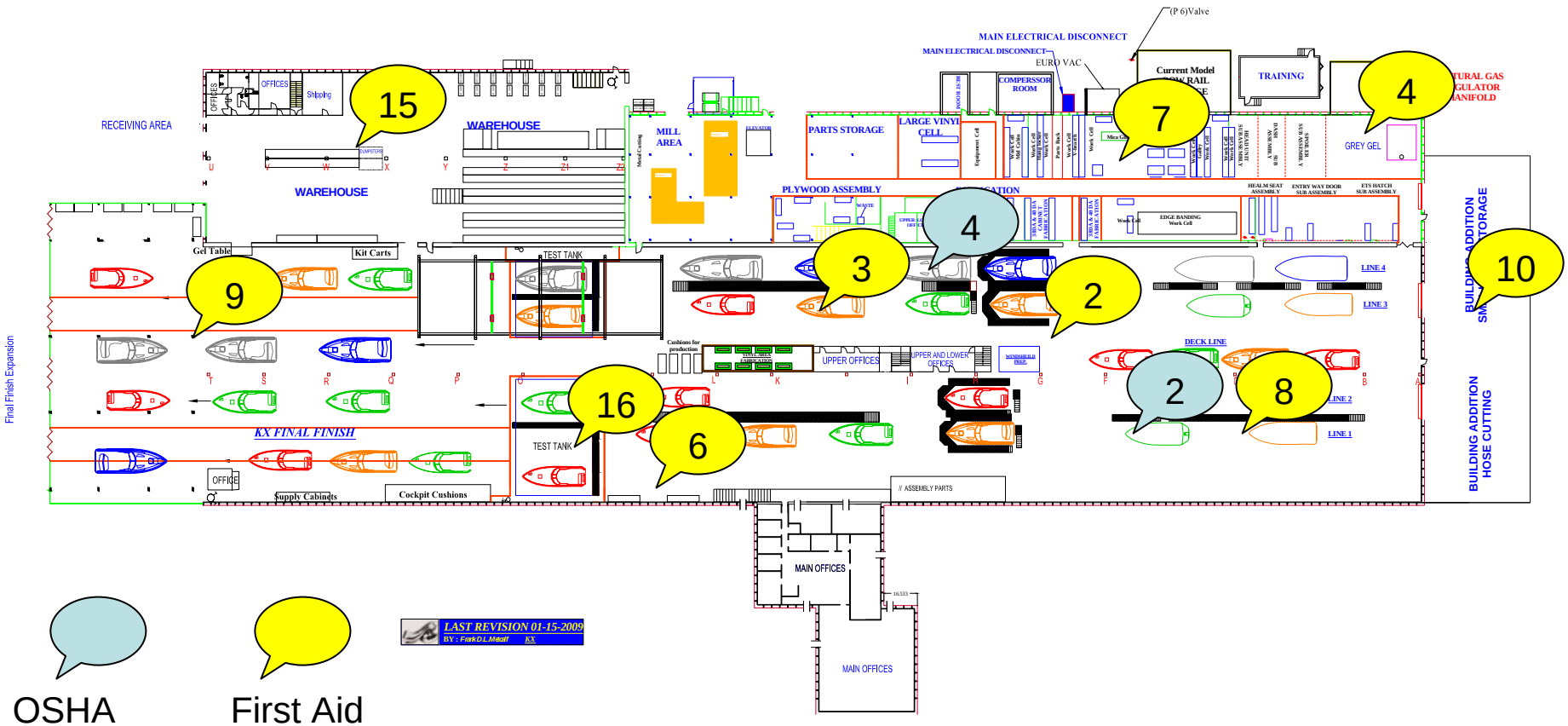
KX Plant – Injuries YTD September 2010



First Aids – 45

OSHA Recordable - 3

Assembly Pin Map



OSHA Recordable

First Aid

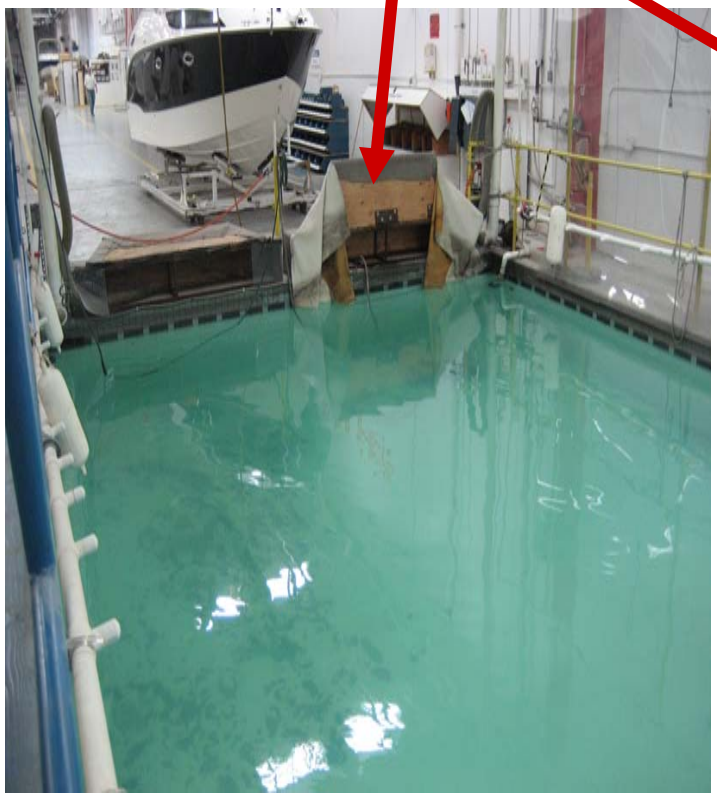
“Hazard Communication Demos”

- **Importance of Container Labeling**
- **Compressed Gas Cylinder (Frost Bite Risk)**

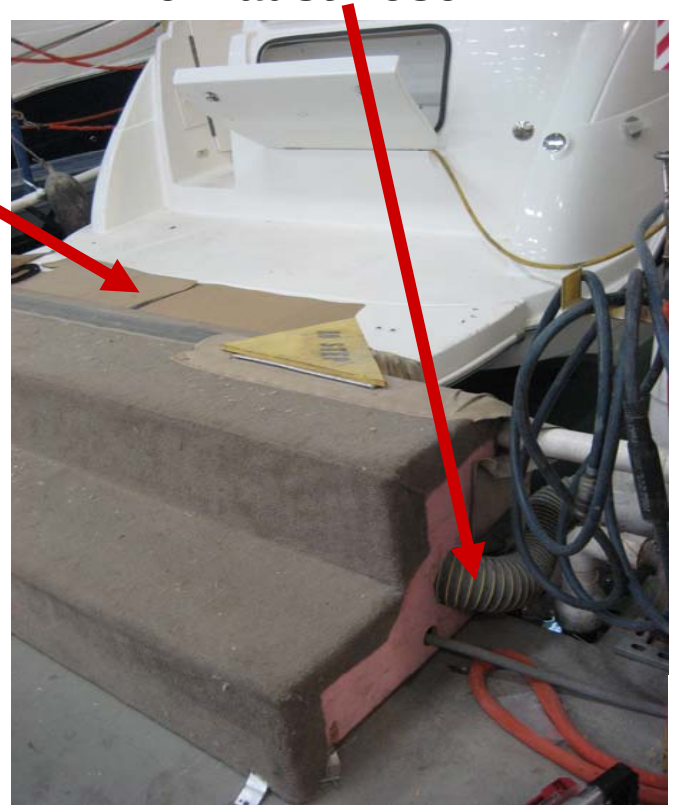
Carbon Monoxide Hazard

Engine Test Tank CO Aprons and Exhaust System

Enclosure Apron to capture engine exhaust



Boat in Test Pool enclose by Apron with attached CO exhaust hose



What makes MEKP go boom?

- Has a feature known as SADT – Self Accelerating Decomposition Temperature.
- If it gets hot enough or if it is exposed to certain kinds of **contaminants** it will ignite or if contained explode. Contaminants such as grinding dust, dirt, rust, certain metals, and other chemicals.
- Flashpoint of 140 to 200 degrees F
- It's a strong oxidizer & combustible. When it burns, it burns aggressively & will seek out anything else that will burn. (Good housekeeping and keeping MEKP separate from anything that is flammable is critical.)

How do you treat an Mekp Ignition or prevent SADT acceleration?

- WATER is the most effective means for treating and Mekp ignition or to cool down Mekp that is trying to achieve SADT.
- Dry Chem is okay but can re-ignite.

REMEMBER!

- MEKP (Catalyst) is a strong oxidizer and corrosive to the skin and eyes.
- Often a person may not realize his skin is being burned by MEKP.
- If spill on skin or clothes….always remove contaminated clothing and thoroughly rinse with water!

- **Restrict the # of employees allowed to handle MEKP!**

Pump

Water Bottle

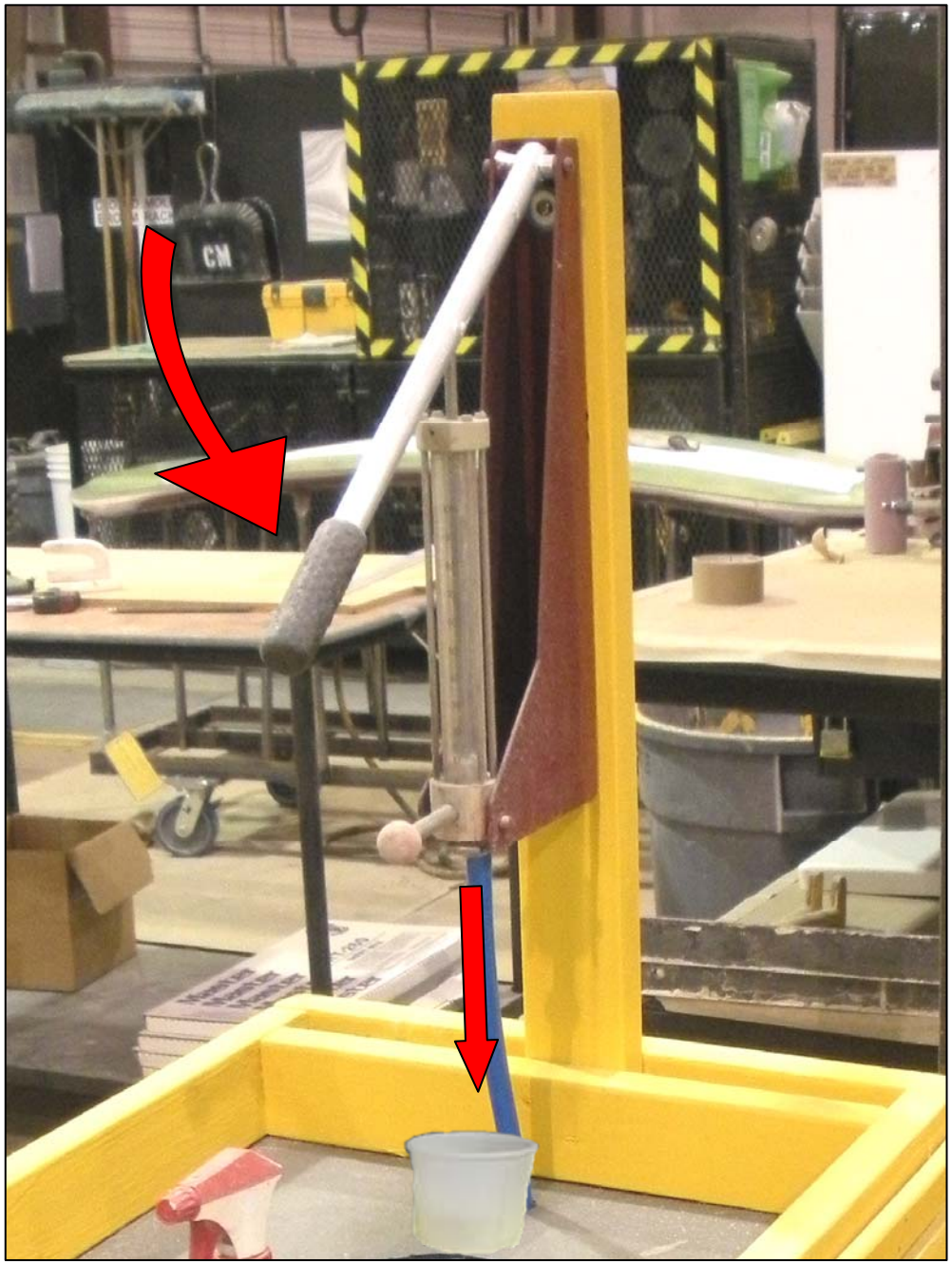
MEKP Bottle

Faceshield

Pump

Stirring Sticks

Eye Wash



•Pull handle down and empty MEKP into cup.

MEKP Mixing Station

MVP Quick Shot Dispenser

MEK-P/Resin Pump Cabinets Type 304 2 B Stainless Steel

- Type 304 2B Stainless Steel Structure
- Segregates MEKP container from Resin inlet to Pump
- Sprinkler head inserted into cabinet. Water is fast deactivator of MEKP as well as extinguishing agent.
- Spill containment
- Non-combustible cabinet

Contributing Factors

M.E.K.P. absorbent pad was put in the Wrong area. Pad is currently laid on top of grate in containment area where the 4 ½ gallon jug is housed. Pad is dry and allows dust to settle with raw M.E.K.P. on pad generating heat.

Improper usage and placement of pad and poor housekeeping were contributing factors.

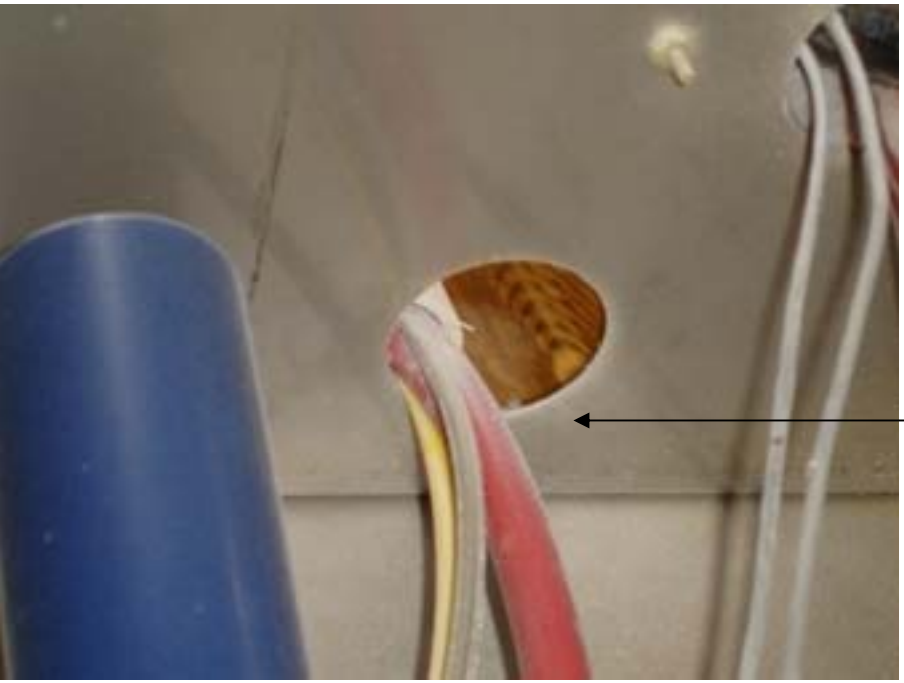
M.E.K.P. Near Miss Incident

Melted jug with absorbent pad impressions on bottom of jug where heat melted it to the jug

M.E.K.P. Jug Melted from heat

Absorbent Pad melted to top of grate

Other Contributing Factors. Dust Source



Although the Stainless Steele Cabinets are kept shut, our dust source was coming from the top of the cabinet at the sprinkler and hose openings.

MEKP/Resin Pump Cabinets and Other MEKP Stations

DO"S AND DON'TS

Don't

Never put absorbent pads on top of containment unit,

DO

MEKP stations are to be inspected & cleaned on a daily basis. Pads (if used) are to be put in bottom of containment with 1" of water

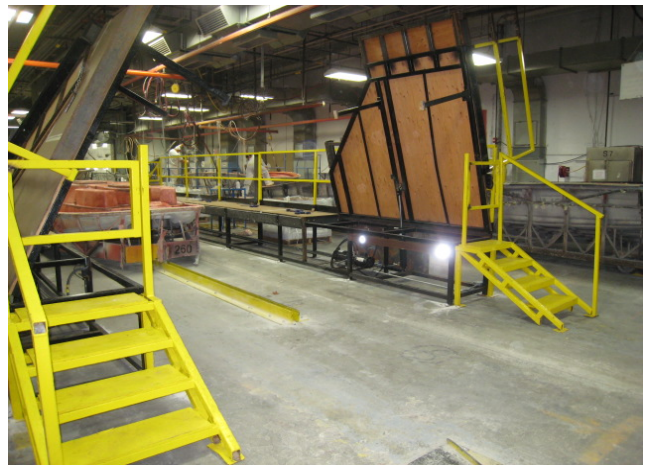
Infrared Gun Thermometer
Confirm Polymerization is Complete

Common Safety Problems with Platforms & Catwalks for Lamination and Assembly

- Trip hazards created by uneven flooring between different sections of platforms.
- Step-through hazards created by **Gaps:**
  -Between platform & molds

  -Between platform & boats
- Fall hazard created by inadequate or lack of guardrailing.
- Poor ergonomics created by awkward body positions to reach into molds, etc.

Lamination Catwalks (Before vs After)



Fall Protection: Past Assembly Catwalks and Boat Access

- **Old cat walks created trip hazards, longer entry/exit time, took up space**

- **Visible gaps, railing not always tight**

Boat Access & Fall Protection for Assembly Line

Platform secured to back of boat

Adjustable railing for boat size variation to eliminate gaps

Fall Protection (Netted Railing)

OSHA 1910.24, 1910.25, 1910.26, 1910.27, 1910.28, 1910.29 & 1910.321(d)

Guardrailing--Capable of withstanding a load of at least 200 lbs applied force

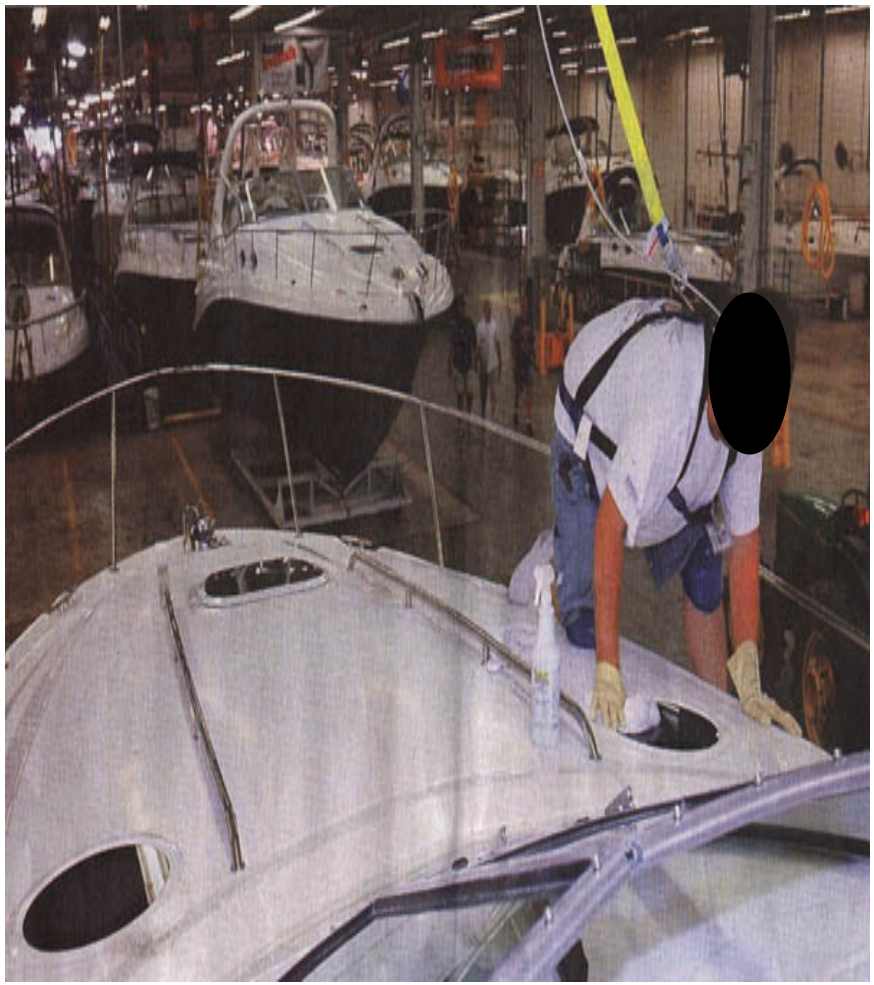
Fall Protection (Netted Railing)

Before Conditions:
In the past, our boats had no fall protection that would prevent a team member from falling 20 ft or more to the ground. We did not have rails to use lanyards, therefore, the sides were open for falling opportunities.

Solution:
Side protection netting was fitted and made for our boat models through Innovative netting. The netting starts at the first stanchion and goes to the end of the bow rail on the aft end, allowing team members to walk along the sides of the boat without fear of falling. We also recently added an addition piece that runs from the last section at the aft end of the bow rail out to the golden-gate to secure to a steel rod that has been added to golden-gates, covering the entire length of the hull

Fall Protection (PD&E Plant)

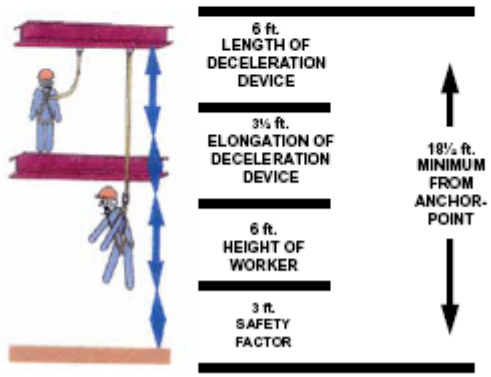
Fall Arrest Harness



Know Your Fall Distance

When using a Personal Fall Arrest System knowing your potential fall distance is a **life** or **death** situation. To calculate your fall distance use the following formula:

Length of the Deceleration device + Elongation of Deceleration device + Height of the worker + Safety factor =Total Fall Distance



Self-Retracting Lifelines (SRLs) may be better alternative to lanyards.

Fall Protection

SUSPENSION TRAUMA

Research indicates that suspension in a fall arrest device can result in unconsciousness, followed by death, in less than 30 minutes.

- Rescue suspended workers as quickly as possible.
- Be aware that suspended workers are at risk of orthostatic intolerance and suspension trauma.
- Be aware of signs and symptoms of orthostatic intolerance.
- Be aware that orthostatic intolerance is potentially life threatening. Suspended workers with head injuries or who are unconscious are particularly at risk.
- Be aware of factors that can increase the risk of suspension trauma.
- Be aware that some authorities advise against moving the rescued workers to a horizontal position too quickly.

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Fall Arrest Equipment

There are several aspects to Fall Arrest Approach to Fall Protection:

- Daily pre-use inspections of harness & lanyard
- Annual inspections
- Competent person for determining arrest system
- Etc.

Safety for Suspended Loads
(Secondary Protection for Suspend Load)

-Use of **blocks** during **capping**.

-Lighter weight **aluminum blocks** replace heavy wooden blocks

DAILY CHECKOFF LIST

- ❑ Platform (Catwalk) proper distance to mold. Gaps closed off.
- ❑ Wheels locked.
- ❑ Platforms properly assembled and secured.
- ❑ Platform free of trip hazards (cords, air lines, hoses, and tools).
- ❑ Guardrailing present and in working order.
- ❑ Checklist is clearly visible.

Initials_____ Date_____

HATCH GUARDRAILING (ALUMINUM)

Marking Hatches for Cutting & Grinding Dept—Prevent Step-through!

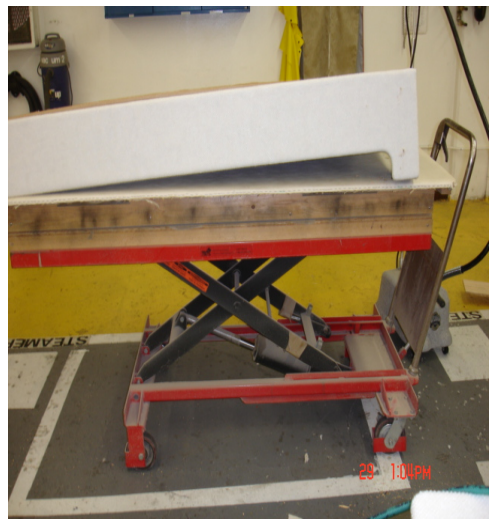
“Ergo Demo”

Ergonomic Solutions - Adjustable Work Tables

Before Conditions:
Fabrication team members used to work on tables that were solid and all one height. This causes ergonomic issues and possible back injuries and discomfort with team members and different heights.

Solution:
Through a Kaizan event in the upholstery area, the table height and inability to adjust them for different team member height came out of the voice of the customer. The tables were researched and now all work tables in the upholstery area are adjustable for any height. The department also did 5'S and created a safer and more organized work area that can accommodate any height.

(The use of the lift tables was expanded through out the facility in various processes.)



Safety

- Ergonomic issues created from mixed lines
  - Adjustable work benches helps to eliminate potential injuries
  - Allows for more efficient work
    - Employees can build multiple parts from same bench

Ergonomic Solutions/ Fall Opportunities

Before Conditions:
In the past, gunwale installers had to try and handle the gunwale, pull their body weight and the weight of the cart and tools by pulling on the side of the boat. Definitely causing ergonomic issues and possible sprains/strains or falls.

Solution:
We worked with sister facilities and through moving of assets and very little money, we were able to create a gunwale installation cart from a scissor lift that we received from another facility. The work station was also set up for better working conditions for the installer as to where the tools go and proper ergonomics of use.
.

Ergo Study Scores:

Before:	**Section 1 – 110 / Section 2 – 86**
After:	**Section 1 – 35 / Section 2 - 43**

Windshield Lift Replacing Manual Lifting

Assembly

Assembly JHA's for 2009/Before & After

Cabinet Installation

Before

- Problem: Upper salon cabinet was heavy and awkward for lifting in boat creating unsafe condition while trying to maneuver part in and through cockpit.

After

- Solution: Changed procedure to use lifting hoist to put part into cockpit eliminating hazard.

Ergonomic Solutions - Wood Floor Transport Cart

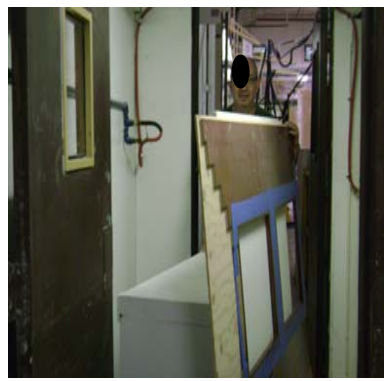
Before Conditions:

Fabrication department was responsible for complete assembly of wood floors for later installation. This would be done on a normal work table, tongue and groove assembly on top of a pre-cut pattern backer For the specific model and room. Once assembled, it required two people to lift and carry to the lacquer spray booth for finishing and again, once finished, to the boat for installation.

Solution:

With team member brain storming, the solution was simple. Combine a working table, with a means to transport, and also with the ability to pass through walk ways and booth entry doors without having to lift and carry the part or utilize two people.

Answer: Moveable work table with flip up / flip down top, hinged and with a securing lock. Lip on edge holds flooring in place when vertical.



Ergo Study Scores:

Before: Section 1 – 20 / Section 2 – 64

After: Section 1 – 0 / Section 2 - 8

Ergonomics--QuicKART

Before –

Manually rolling mold units
in and out of building

After –
Using QuicKART to move units

10 and 20 Manual Sausage Caulk Guns COX 5100 Series **Can also be used for Cartridges**

Come in 12:1 and 18:1 Mechanical Advantage – Much easier to apply

Newborn 112D
10:1 Mechanical Advantage

More Difficult for Thicker Caulk Applications

1:1 Mechanical Advantage - Manual Caulk Gun – Should be Eliminated from facility

Improve Ergonomics & Eliminate Trip Hazard (Cordless Tools)

CORDLESS TOOLS

- **Eliminates trip hazards created by extension cords and airlines**
- **Eliminates risk of electrical shock from extension cords**
- **Possibly improve ergonomics due less force from cords & airlines, less awkward positions. However, tool weight and other issues may exist.**
- **Manufacturers continue to develop more ergonomically friendly cordless tools…lighter weight, improve handle & trigger designs, features to minimize torch impact upon the hand & wrist.**

UPHOLSTERY ERGONOMICS IMPROVEMENT PROJECT

Vinyl Warmers Installed

- Vinyl Heat Booth
  - •Warms vinyl for easier stretching
  - •Less strain on hands and wrist

Employee Environment – Head unit A/C (PC Plant)

Before Conditions:
Fabrication team members are challenged with completing head/shower unit build. Units are extremely small work spaces with little access for any air flow during extremely hot weather conditions. Team members would have to exit periodically when summer temperatures are extreme. Some units could require up to 13 hrs to complete.

Outside air temp - 92 degrees
Temperature inside shower unit- with - NO A/C on = 88.9

Solution:
With utilizing existing portable A/C units and minimal expense, department rearranged flow to place head / shower units along a wall, enabling installing of duct work. Drops were made at each work station, with flex hosing used to connect to A/C vents already installed as part of product build. This provides cooled air circulation inside as build is completed.

1 portable A/C unit cools 3 shower heads
Outside air Temp-92 degrees
Temp inside shower unit with A/C on = 80.2 dropping the temp inside the unit by 8.7 degrees.
Air flow from A/C unit is 70.1 degrees at vent in unit,

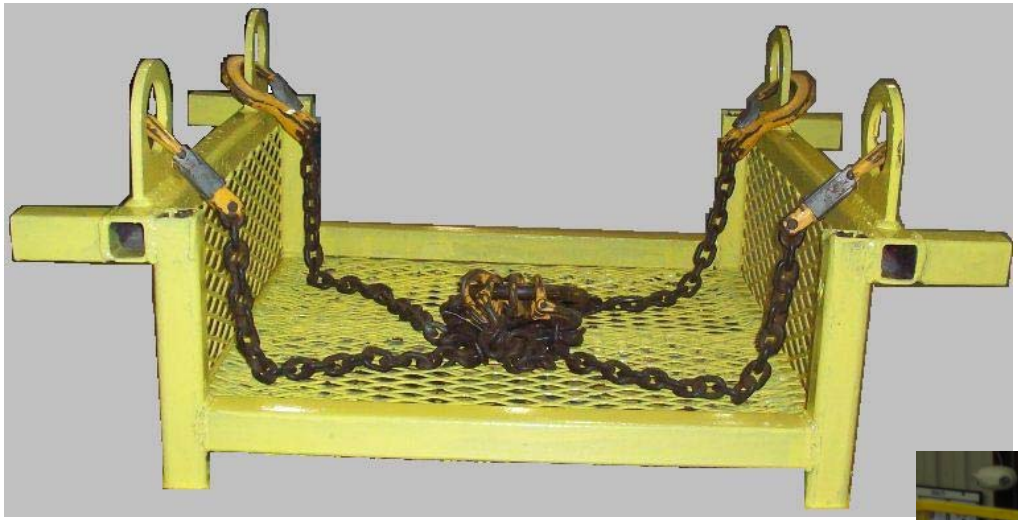
Lamination Ventilation System Upgrades

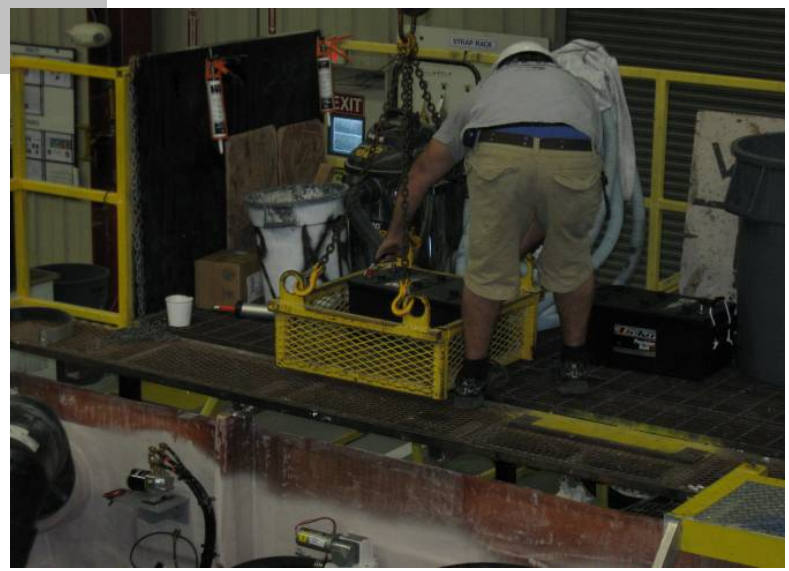
Evaporative Cooling Units

Computer-base Modeling to aid in design of system

More Stable Base to Stand On

Modified battery lift basket design to reduce personnel lifting 130 lb. batteries.





Safer Boat Entry at Dock

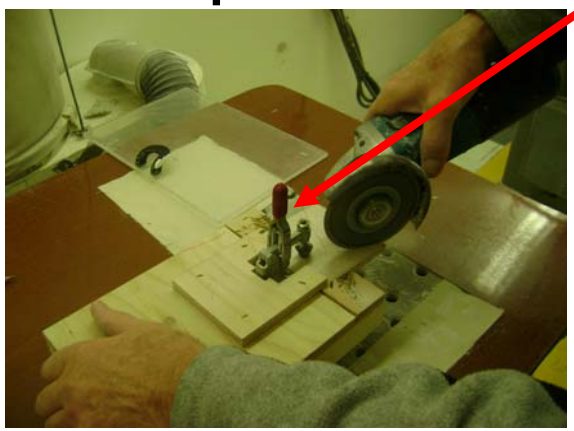
Dock gankplanks provide sturdier entry into boat with guardrail protection on both sides. Gankplanks are raised and lowered with cable & pulley.

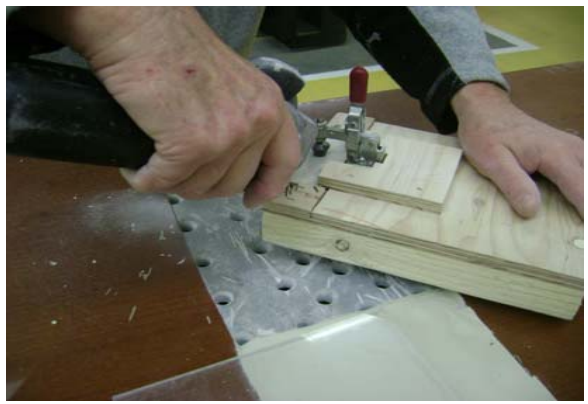
Fabrication

Job Hazard Analysis--Improvement

Tile Cutting (Before)—Hand in path of abrasive wheel

After Improvement—Clamp to keep hand clear of abrasive wheel





Warehouse / Kaizen Event – Windows & Entry Doors Processing

PVC/ Exterior Storage

Before

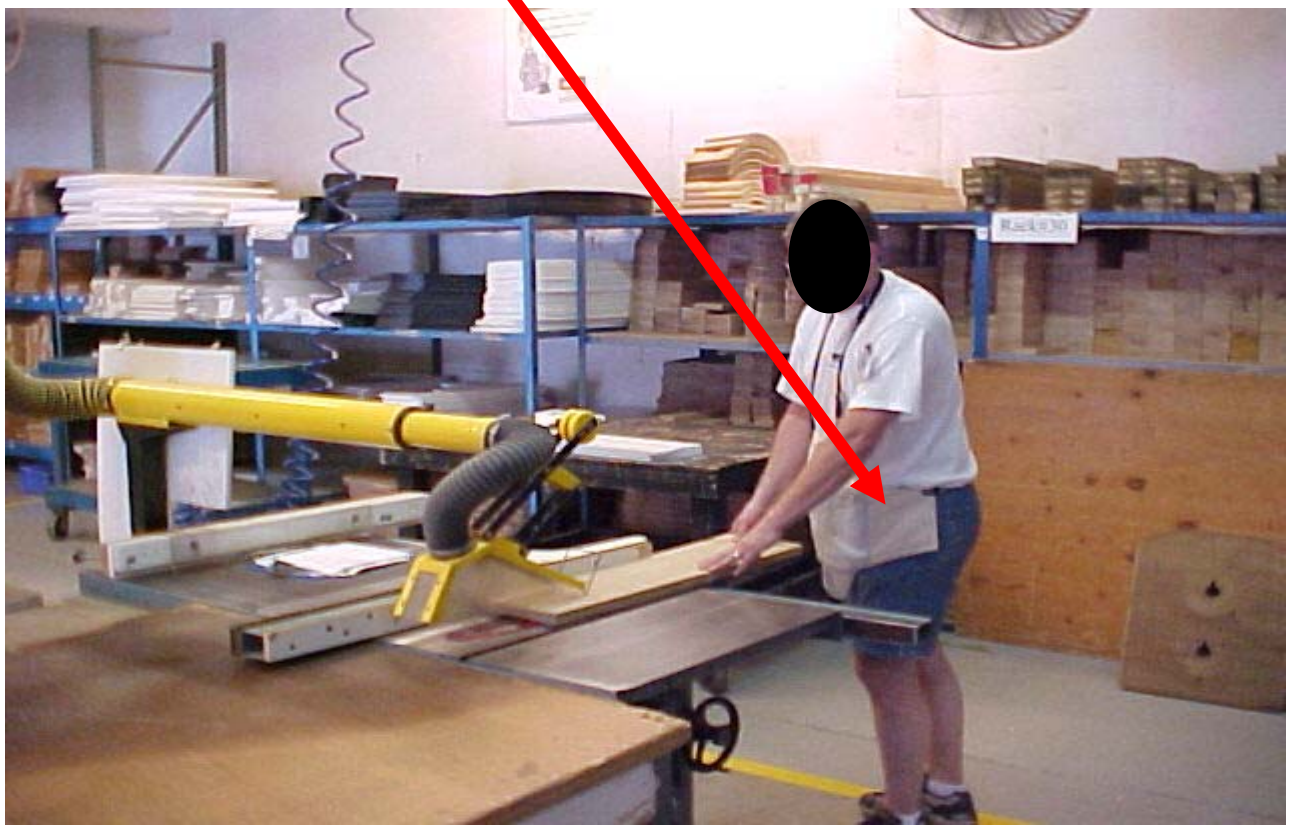
- Problem: Unorganized and inadequate storage system which allowed for product mutilation and excessive handling.

After

- Solution: Installed specific racks with part identifications and organization including optimized inventory levels.

Fabrication/Woodshop Safety

(Kickback Apron for Table Saw Operators)



Why SawStop Table Saws?

Severe Amputations

vs.

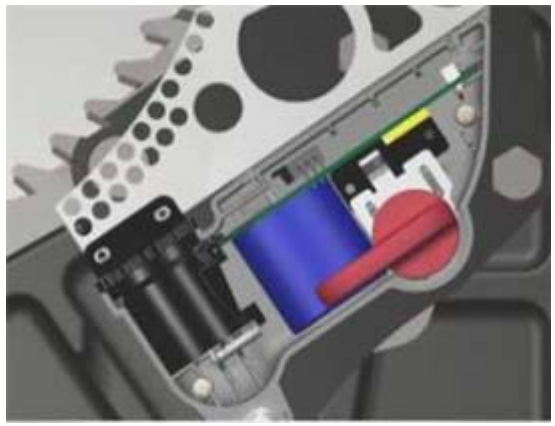
Minor Nicks

SawStop Table Saws

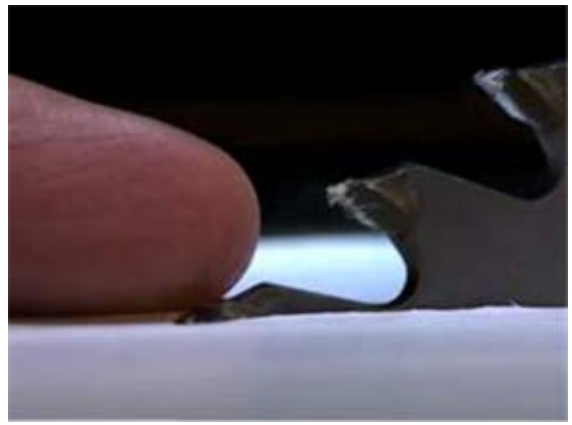
- **Detects contact with skin**
- **Stops the blade within 5 milliseconds of contact**

How It Works

A small electrical charge is applied to the blade



A digital signal processor continuously monitors the charge



The system instantly detects contact with skin

The brake is activated, stopping the blade cold

The blade’s angular momentum drives it beneath the table

All of this happens faster than a single flap of a honey bee’s wing

Putty Machine—Guard Pump Stroke Arm

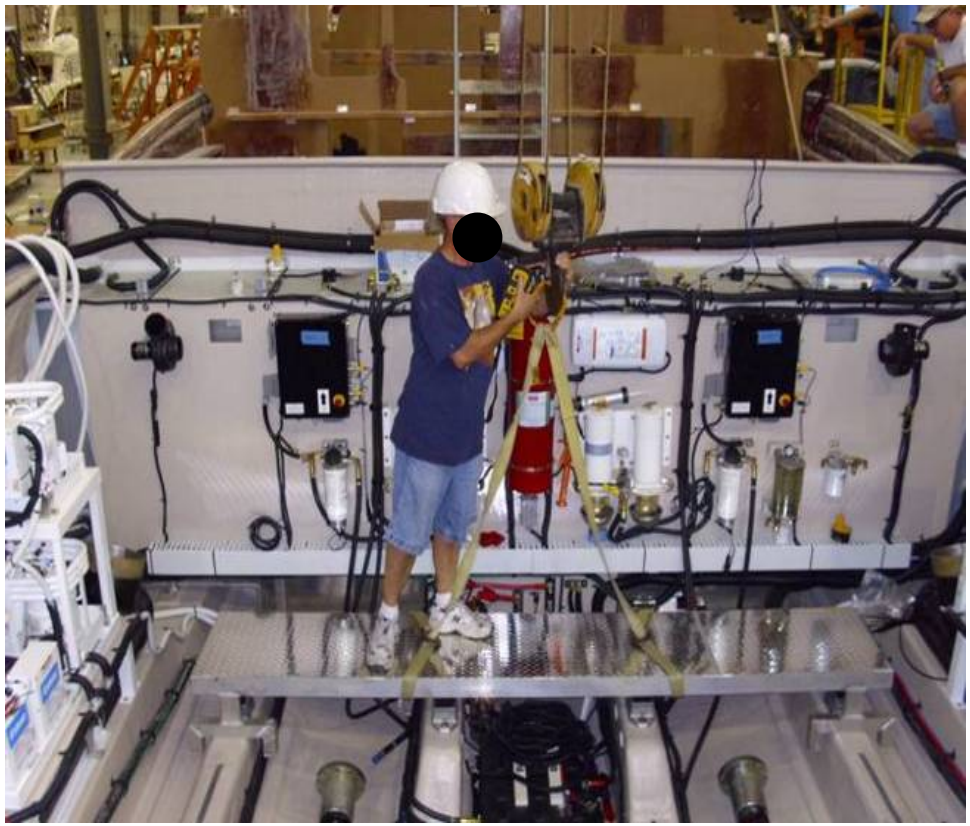
When laying out hoses on port and starboard sides for engine room there was potential to trip over components and engine mounts or slip on gel coated surfaces and stringer tops.

When clamping hoses onto fills and vents the employees were standing on engine mounts to secure hoses or climbing on top of tanks.

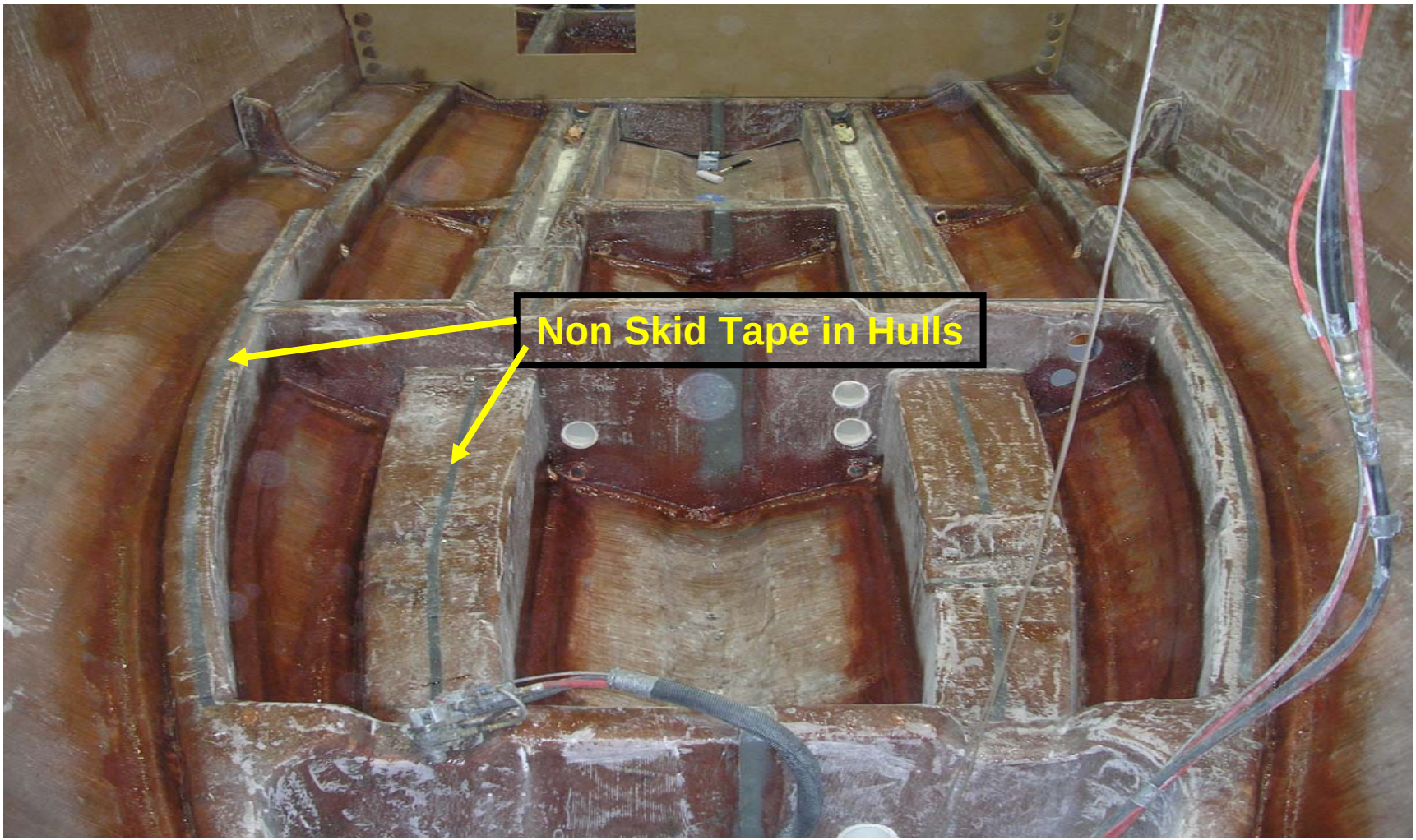
Yacht Assembly—Safety Platform (Engine Station)

Created a removable platform to fit in engine room at forward engine mounts.

Improves accessibility (reach) & creates level walking surface to reduce trip/fall hazards



Slip & Fall Protection



The waste water may be shipped off site as non-hazardous waste or may be disposed of in sanitary sewer, per city permission. Also added to Stormwater Plan.

Vendor for Net Guardrailing (Fall Protection)

Innovative Netting Systems, Inc.

645 Gladiola Street

Merritt Island, FL 32952

Phone: (321) 453-7477

Rescue Step for Fall Arrest Harness System—Vendor Info.

R.S. Hughes Company, Inc.

P.O. Box 680459

Orlando, FL 32868

Phone: (407) 297-6800

Item Description: AEARO R100 RESCUE STEP

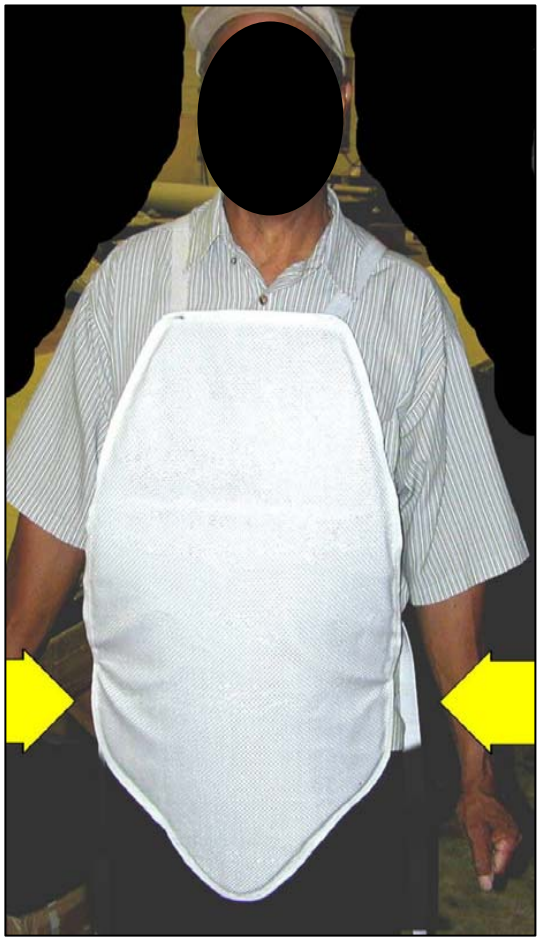
SawStop Table Saw Vendor Information

SawStop, LLC
9564 S.W. Tualatin Road
Tualatin, OR 97062
503-570-3200 phone
www.sawstop.com

- **Today:**
  - Over 700 confirmed saves!
  - Price points from $1,599 to $5,000+
  - 35 patents issued / many others are pending
  - 2004: First cabinet saws in production
  - Over 20,000 saws shipped

Fabrication/Woodshop Safety

(Protector Kickback Apron for Table Saw Operators)



Material: Supreme Protector coated UHMW-PE 900-lb break/inch
Thread: Supreme Protector SPT138 80-lb test
Design: Sawyer/KickBack Protective Aprons
Guarantee: Lighter Weight and Longer Life than Leather of Equal Size

KBL-V-SR - $120/ea
17" x 27" size large
Ribbed and mesh ventilated inner face
Quick-adjust, replaceable snap fasteners
Fast on-and-off crisscross straps

Kickback aprons from JHRG are made from Supreme Protector fabric, the toughest lightweight synthetic material made. KickBack aprons are backed with breathable nylon mesh and filled with high-density military non-woven impact padding. Put it all together and you have a lightweight, rip- and chemical- resistant apron to protect workers from impact injuries associated with rip saws.

web: www.hsarmor.com