ELECTRICAL/ELECTRONIC WORKBENCHES
ELECTRICAL/ELECTRONIC WORKBENCHES

References


2.) NSTM 300 R7 APPENDIX H

3.) NSTM 300 R9 APPENDIX H

4.) MIL-STD-1686C Electrostatic Discharge Control Program

5.) MIL-HDBK-263B Electrostatic Discharge Control Handbook

5.) 241508Z AUG 04 (ISE) ADVISORY NO. 019-04 R 241508Z AUG 04 (NON-CVN)

6.) 251722Z AUG 05 WORK BENCH MAINTENANCE POLICY (CVN)

7.) CNSL READINESS STANDARDS GUIDE (RSG) ELECTRICAL SAFETY PROGRAM
SAMPLE OF CERTIFIED ELECTRICAL SAFE WORKBENCH
ELECTRICAL/ELECTRONIC WORKBENCHES

Common Issues

1.) Exposed metal
2.) Missing Nylon screws
3.) Missing Electrical grade rubber matting on deck, in front of the workbench.
4.) Improper CPR placards.
5.) Disconnect switches do not electrically isolate ALL circuits associated with the workbench
6.) Gaps in insulated cover.

SAMPLE OF WORKBENCH WITH SERIOUS ISSUES
ELECTRICAL/ELECTRONIC WORKBENCHES
What it shouldn’t be
ELECTRICAL/ELECTRONIC WORKBENCHES

What it shouldn’t be
ELECTRICAL/ELECTRONIC WORKBENCHES

Common Myths

Question: On some ships, surfaces above the top working surface, metal structures and objects adjoining the workbench and within the reach of the technician, shall be insulated.

Answer: 300-H.1.3 (300 R9) On some ships, surfaces above the top working surface, metal structures and objects adjoining the workbench and within the reach of the technician **MAY** be insulated. **(THIS IS ACCEPTABLE BUT IS NOT REQUIRED.)**

Question: 2M/MTR work benched have to be on an electrical safe workbench?

Answer: 2M/MTR work bench can be on mechanical workbenches with convenience outlets.
40.1.4 Work bench surfaces. Work benches which contact ESDS items and personnel should have ESD protective work surfaces. Work bench surfaces should be connected to ground through a ground cable. The resistance in the bench top ground cable should be located at or near the point of contact with the work bench top and should have sufficient resistance to ground to limit current to the perception level in MIL-STD-454, requirement 1, considering all parallel resistances to ground such as wrist ground straps, table tops and conductive floors. ESD protective work surfaces are available in a variety of materials. These materials are either conductive or dissipative and may be temporarily or permanently installed on the work bench. Examples of materials which may be used for work surfaces are:

(a) Metallic materials such as stainless steel
(b) Carbon impregnated plastics
(c) Surfactant treated plastics
(d) Laminates
(e) Other materials manufactured or constructed in a manner to be conductive or dissipative
ELECTRICAL/ELECTRONIC WORKBENCHES

2M WORKBENCH

As previously stated 2M workbenches have to be IAW MIL-HDBK-263B, and Mil-STD-1686
ELECTRICAL/ELECTRONIC WORKBENCHES
DISCONNECT SWITCHES

OLD REQUIREMENTS 300 R7

Type 1. **One switch** (pushbutton station) disconnects all power (60Hz, 400Hz, DC) to all workbench EPOPs and electrical receptacles and test switchboards. PREFERRED METHOD.

Type 2. In large workshops, *multiple disconnect* switches are wired so activation of any switch secures ALL workbenches and test switchboards.

Type 3. **Circuit breakers** in power panels disconnect power to workbench EPOPs and receptacles and test switchboards. Some ships may have combinations of two or more types.
ELECTRICAL/ELECTRONIC WORKBENCHES
DISCONNECT SWITCHES (CHANGE)

Type 3. Power disconnect switches or circuit breakers in power panels located in the compartment used to disconnect each type of power to workbench EPOPs or receptacles and test switchboards. Some ships may have combinations of two or more types.

c. Type 3. Power disconnect such as rotary snap or push button switch(es) shall be located just inside the access to the space. These switches shall disconnect ALL power (60Hz, 400Hz, DC) to workbench EPOPs and electrical receptacles. The switches shall be visible to personnel entering the space, readily accessible to safety observers and clearly identify which workbenches the switch controls. The bulkhead mounted disconnect switch shall be located 48 to 54 inches above the deck, within a red-painted target. Switch height requirements may be modified to conform to space design restrictions and with the supervisor approval. The switch shall not be part of the normal protection devices for the workbench or test switchboard. Power panels (60Hz, 400Hz, DC) installed in the same compartment as the workbenches may be used as workbench and test switchboard power disconnects. The circuit breaker(s) inside the power panel(s) shall be clearly marked with a red target around them for easy identification.
ELECTRICAL/ELECTRONIC WORKBENCHES
DISCONNECT SWITCHES
ELECTRICAL/ELECTRONIC WORKBENCHES
SIGNS AND LABEL PLATES

Above the electrical/electronic workbenches used for working on energized equipment post this sign.

Above workbenches that are ONLY USED to work on UNENERGIZED electrical equipment post this sign.

Near the workbench and test switchboards post the following signs giving the approved method of rescuing personnel in contact with energized circuits.

**DANGER**
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH ENERGIZED CIRCUITS
THIS IS AN ELECTRICALLY SAFE WORKBENCH

**DANGER**
WORKING ON ENERGIZED ELECTRICAL EQUIPMENT IS PROHIBITED ON THIS WORKBENCH
THIS IS NOT AN ELECTRICALLY SAFE WORKBENCH
ALL POWER SOURCES EXCEPT 110V CONVENIENCE POWER HAVE BEEN DISABLED AT THIS WORKBench

**DANGER**
DO NOT ATTEMPT TO ADMINISTER FIRST AID OR COME INTO PHYSICAL CONTACT WITH AN ELECTRIC SHOCK VICTIM BEFORE THE POWER IS SHUT OFF

**DANGER**
REMOVAL OF PERSONNEL IN CONTACT WITH ENERGIZED ELECTRICAL CIRCUITS
DO NOT TRY TO REMOVE VICTIM WITH YOUR BARE HANDS
1. DEENERGIZE THE CIRCUIT IF POSSIBLE
2. IF CIRCUIT CANNOT BE DEENERGIZED
   - YOU MUST INSULATE YOURSELF FROM HIS ENTIRE BODY BY USING A NON-CONDUCTOR TO PUSH HIM FREE ON THE CONTACT
   - IF YOU ARE IN CONTACT WITH A LIVE CIRCUIT AND NO ONE IS NEARBY TO HELP, TRY TO BREAK THE CONTACT BY THROWING YOUR BODY.
ELECTRICAL/ELECTRONIC WORKBENCHES
SIGN AND LABEL PLATES

Post this label plate near the emergency cut-off switch(es)

FOR EMERGENCY USE ONLY
WORKBENCH DISCONNECT SWITCH
ELECTRICAL/ELECTRONIC WORKBENCHES

SIGNS AND LABEL PLATES

Adjacent to the workbench and test switchboard (if applicable) post a Cardiopulmonary Resuscitation Placard and the DANGER sign above.

(GSO) Sec 665: Cardiopulmonary resuscitation instructions including a BUMED approved method of rescuing personnel in contact with energized circuits shall also be posted adjacent to the electrical/electronic workbenches.
ELECTRICAL/ELECTRONIC WORKBENCHES
SIGNS AND LABEL PLATES
Adjacent to the workbench and test switchboard (if applicable) post a Cardiopulmonary Resuscitation Placard and the DANGER sign above.

CPR INSTRUCTIONS

1. CHECK FOR RESPONSIVENESS
   GENTLY SHAKE VICTIM. SHOUT ARE YOU OK? IF UNRESPONSIVE, CHECK FOR BREATHING, AND CALL FOR HELP. POSITION THE VICTIM FLAT ON THEIR BACK ON A FIRM SURFACE BY ROLLING THE VICTIM OVER, MOVING THE ENTIRE BODY AT ONE TIME AS A TOTAL UNIT.

2. CHEST COMPRESSIONS
   PLACE YOUR HANDS IN THE CENTER OF THE PERSON’S CHEST BETWEEN THE NIPPLES. PLACE ONE HAND ON TOP OF THE OTHER. PROVIDE 30 COMPRESSIONS 2 INCHES DEEP.

3. OPEN THE AIRWAY
   USE HEAD TILT/CHIN LIFT METHOD. KNEEL BesIDE VICTIM’S SHOULDER. LIFT CHIN GENTLY WITH ONE HAND WHILE PUSHING DOWN ON FOREHEAD WITH THE OTHER TO TILT THE HEAD BACK.

4. OPEN THE AIRWAY (POSSIBLE NECK INJURY)
   USE A MODIFIED JAW THRUST, KEEPING THE VICTIM’S HEAD IN A NEUTRAL POSITION.

5. BREATHING
   IF VICTIM IS NOT BREATHING, PINCH THE NOSE CLOSED AND COVER THE VICTIM’S MOUTH WITH YOURS. GIVE 2 FULL BREATHS FOR 1 TO 1.5 SECONDS EACH, ALLOWING THE LUNGS TO EXHALE BETWEEN BREATHS. CONTINUE WITH ANOTHER CYCLE OF COMPRESSIONS.

6. CONTINUE PROVIDING 30 COMPRESSIONS TO 2 BREATHS UNTIL HELP ARRIVES.

<table>
<thead>
<tr>
<th>RESCUEES</th>
<th>RATE OF COMPRESSIONS TO BREATHS</th>
<th>RATE OF COMPRESSIONS</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>30:2</td>
<td>100 TIMES/MIN</td>
</tr>
<tr>
<td>2</td>
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<td>100 TIMES/MIN</td>
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ELECTRICAL/ELECTRONIC WORKBENCHES
Re-designation of Electrical Workbench to Mechanical Workbench

REQUIREMENTS TO CONVERT AND REDESIGNATE AN ELECTRICAL WORKBENCH TO A MECHANICAL WORKBENCH.

Electric and electronic work benches are installed as a matter of configuration identity in accordance with record drawings to support safe anticipated maintenance and repairs. Removal of associate electrical attributes that were provided at original installation can affect mission and maintenance capability. Electrical safe work benches shall be maintained in accordance with NSTM Chapter 300 Appendix H, PMS and technical directives. Difficulties in obtaining bench repair parts or in maintaining the bench electrically safe for energized work shall be brought to the attention of the Ships Maintenance Officer. Additional maintenance resources and assistance are available by utilizing the regional maintenance center engineering agents. In the event that a workbench is no longer required (i.e., existing in a non-electrical work re-designated work space), work benches may be downgraded with approval and direction of the Commanding Officer and approved Departure from Specification.
ELECTRICAL/ELECTRONIC WORKBENCHES
Re-designation of Electrical Workbench to Mechanical Workbench

- **Obtain approved** Departure from Specification (DFS) to convert and re-designate the electrical workbench to a mechanical workbench.

- In **ALL** cases it will be required to properly identify the connected power sources including 450V, 110V, DC and 400Hz sources with the exception of retaining power for the 110-volt convenience outlet.

- Remove original placard that identified the workbench as an electrical safe workbench and change to placard identifying workbench as a mechanical workbench; work on energized electrical equipment is prohibited on this workbench and all power sources except 110-volt convenience power have been disabled at this workbench.

- Each ship is **required to have at least one Electrical Workbench and more should be considered on larger ships**. For specific ships, review ship’s drawings.
ELECTRICAL/ELECTRONIC WORKBENCHES
MECHANICAL WORKBENCHES 300 FIGURES

* SERVIT POST GROUND SUPPORT BRACKET (TERMINAL BOARD) SHALL BE INSTALLED ON THE BACK PANEL ASSEMBLY OF THE ELECTRIC POWER PANEL (SEE NAVAIR DRAWING NO. 63A114F12)
ELECTRICAL/ELECTRONIC WORKBENCHES
MECHANICAL WORKBENCHES 300 FIGURES

Figure 300-H-2 Insulation
Figure 300-H-3 Insulation

FOUNDATION - PLASTIC LAMINATE OR ELECTRICAL GRADE MATTING

PLASTIC LAMINATE (1/32" MINIMUM)
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<th>PART/COMPONENT</th>
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<tbody>
<tr>
<td>Insulating material 3/8 inch (L-P-513 or ASTM D709)</td>
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<tr>
<td>PLASTIC LAMINATE</td>
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<td>Insulation Sheet, Electrical</td>
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<td>PLASTIC LAMINATE</td>
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<td>Insulation Sheet, Electrical</td>
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<td>Size: 29.5 inch by 37 inch -to- 38 inch by 48 inch</td>
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<td>Item</td>
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<td>CLIP, POWER 50 AMP</td>
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<td>INSULATING SLEEVE FOR POWER CLIP</td>
<td>5975-00-281-0024</td>
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<tr>
<td>STUD, WELDING 3/8 inch X 2 inch</td>
<td>5307-00-265-9152</td>
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<td>LUG SOLDER TYPE</td>
<td>5940-00-115-0775</td>
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<td>SERVIT POST 1/4-20</td>
<td>5940-00-177-2680</td>
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<td>LUG FOR D-10 WIRE</td>
<td>5940-00-114-1300</td>
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<td>RECEPTACLE PANEL, EPOP, SIX OUTLET SYMBOL 754. 2</td>
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<tr>
<td>RECEPTACLE PANEL, EPOP-II, EIGHT OUTLET</td>
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<tr>
<td>RECEPTACLE PANEL, EIGHT OUTLET, SYMBOL 755.3</td>
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<tr>
<td>1/4-20 NYLON SCREW 3/4 inch</td>
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<tr>
<td>1/4-20 NYLON SCREW 7/8 inch</td>
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<tr>
<td>1/4-20 NYLON SCREW 1-1/8 inch</td>
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<td>10-24 NYLON SCREW</td>
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<td>SPAR OIL VARNISH (A-A-1800)</td>
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<td>CONTACT CEMENT</td>
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<td>WORKBENCH CABINET ASSEMBLY</td>
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