Skills USA Welding Fabrication Competition Update – 2019

State Welding Fabrication Winners:
Congratulations on your accomplishments thus far. Please review these guidelines for the national competition in June. Now is the time to plan and practice your build. Your team will have 6.5 hours to complete your project. Keep in mind your team & project will be judged throughout your 6.5 hours. Manage your time wisely.

The 2018 national contest was the first year fabricating a standard project while thinking ahead to brainstorm and design a concept based project for the 2019. This was a learning experience for all of us however we survived and many positive things came from this. Among the positive was an improved ability to maintain safety and provide every team with equal and objective evaluation; additionally we began thinking of how welding fabrication could support a greater humanitarian cause.

Together we are going to continue this effort! Below you will find the standard project you are building and the concept project you are to design.

1) The standard project is a Sneaker Donation Box. This is the project teams will fabricate this year. These boxes will be donated to WaterStep. Information is provided in advance so your team can start to prepare. For more information on their mission please visit www.WaterStep.org

2) The project you will brainstorm and design is a Dip Tank. These dip tanks will contain a solution of vinegar and steel wool which is used to submerge boards in to be stained. Guidelines for your design will be listed below. Prints for this project theme will be required this year and will be graded as they have been in the past as part of your overall grade.

Please Note: Prints of your design must be ready to turn in at orientation. (See items supplied by teams)

For the project you are designing Welding Fabrication will be supporting the efforts of Sleep in Heavenly Peace a non-profit whose mission is to provide less fortunate children with a bed to sleep on. This organization operates with volunteers who construct and deliver wooden bunk beds to those children and families in need.

Please explore this cause you will be supporting: https://www.shpbeds.org/

Below you will find information to help you prepare for the contest. Be prepared for changes; these are common in the fabrication environment. Plan for stop points during your build; judges will need to inspect welds and other fabrication factors. If you are meticulously going through this update it will become clear what changes may be implemented, where stops points should be and what aspects of the build will impact your score the most.

You are strongly encouraged to prepare at least two checklists to ensure you are prepared.

1) a checklist for your clothing, PPE and hand tools you need to bring.
2) a build checklist to be used during the competition to ensure your team is on track.

Best of luck! – The Welding Fabrication Committee looks forward to another great competition with you.
• **Standard Fabrication Project:**
  (All teams will be fabricating this in June 2019 – *Bring 11x17 copies of the print for your team to work from*)
  - Donation Box

• **Material List Supplied by Committee:**  [SEE MATERIAL CHANGES]
  - Qty. (6) 12’ pcs 1.5” Sq Tubing .125” wall
  - Qty. (1) .229” x 33” x 33” item (4) p.8 (on print)
  - Qty. (1) .089” x 3’ x 10’
  - Qty. (1) .089” x 12” x 18”
  - Qty. (1) 1’ .06” x 12” Piano hinge
  - Qty. (1) 1’ .120” x 24” Piano hinge
  - Qty. (24) .179” x 1.50” x 4.50”
  - Qty. (8) .229” x 1.50” x 4.50”
  - Qty. (12) .31” x 1.00” x 14.00”
  - Qty. (3) 4’ x 8’ Plywood as required – competitors will install on their non-compete day
  - Qty. (1) .089 x 4.75” x 4.75” item (1) p.13 (on print)
  - Qty. (2) .089 x 2” x 2.44” item (1) p.13 (on print)
  - Qty. (1) .089 x .85” x 8.31” item (1) p.13 (on print)
  - Qty. (1) .089 x 4.625” x 66.625”

• **Welding Consumables Supplied by Committee:**
  - .035 Quantum Arc 6 Solid Wire
  - .045 Excel Arc 71 Flux-cored
  - 3/32” Lincoln Excalibur E7018 SMAW Electrodes
  - 1/8” Lincoln Excalibur E7018 SMAW Electrodes
  - 3/32” Lincoln 5P+ E6010 SMAW Electrodes
  - 1/8” Lincoln 5P+ E6010 SMAW Electrodes
  - 3/32 Lincoln ER70S-2 GTAW Filler Rod
  - 1/8” Lincoln ER70S-2 GTAW Filler Rod
  - 3/32” EWCe-2 Electrode
• **Minimum Project Requirements:**
  - 5 Individual SMAW Welds of 3” or greater (Two 3F vertical up welds required)
  - 5 Individual GMAW Welds of 3” or greater (Two 3F vertical up welds required)
  - 5 Individual GTAW Welds of 3” or greater (Two 3F vertical up welds required)
  - 5 Individual FCAW Welds of 3” or greater (Two 3F vertical up welds required)
  - 5 Individual OFC Cuts of 5” or greater

• **Project Theme for Prints:**  *(Team prints will be graded on this concept)*
  - Dip Tanks

• **Guidelines for Design:**
  - Must be able to contain a solution of vinegar and steel wool
  - Allows for 2x4 / 2x6 with a length of 84” (one board at a time)
    - 7” deep
    - 8” wide
    - Easy to load and unload
  - Support legs (32” floor to bottom of tank)
  - Carry handles
  - Tool rack (paint brush, sponge, squeegee, etc…)
  - Ability to drain
  - Tank can be steel or any other material (consider what it will be used for)

• **Blue Print Requirements:**
  - One set of prints on 11” x 17” paper printed in the Landscape mode (for grading)
    - In addition a USB type drive containing prints in PDF format is required
      - USB drive will not be returned
      - Drives will only contain prints for project theme
  - No bindings or covers
  - Title block in lower right hand corner with space titled Team ###.
    - **Your team number will be recorded** by the SkillsUSA staff when you turn in your prints.
  - No school name or identifying marks on the print
  - Max of 10 pages – You must have overall dimensions of the finished product included within the drawings you submit.
  - All Welds **MUST** have appropriate weld symbols included to show where the required welds and weld processes will be used on the parts
  - All vertical welds shall be noted
  - A blueprint can be neatly hand drawn if the team does not have access to design software.
    - An electronically scanned pdf copy is still required for all prints.
  - All prints **MUST** be created by the team.
  - Do NOT roll up paper copies
## Judging Overview:

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
<th>Judging Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY</td>
<td>100</td>
<td>Each safety infraction will be a 5pt deduction</td>
</tr>
<tr>
<td>SMAW</td>
<td>100</td>
<td>5 required welds will be judged on joint fit-up, size, contour and appearance</td>
</tr>
<tr>
<td>GMAW</td>
<td>100</td>
<td>5 required welds will be judged on joint fit-up, size, contour and appearance</td>
</tr>
<tr>
<td>GTAW</td>
<td>100</td>
<td>5 required welds will be judged on joint fit-up, size, contour and appearance</td>
</tr>
<tr>
<td>FCAW</td>
<td>100</td>
<td>5 required welds will be judged on joint fit-up, size, contour and appearance</td>
</tr>
<tr>
<td>OFC</td>
<td>100</td>
<td>5 required cuts will be judged on angle, appearance, dimension, bottom edges slag free and cuts free of chipping marks (Cuts must be judged prior to any cleaning, grinding, etc)</td>
</tr>
<tr>
<td>TEAMWORK</td>
<td>100</td>
<td>Students will be judged on equal participation, team communication and ability to work together</td>
</tr>
<tr>
<td>FABRICATION</td>
<td>150</td>
<td>10 critical dimensions will be judged for accuracy. Overall appearance and functionality is also scored</td>
</tr>
<tr>
<td>ORAL EXPLANATION</td>
<td>40</td>
<td>5 minute oral explanation of the project design and team’s preparation. This will be conducted randomly during the 6-1/2 hour fabrication part of the competition</td>
</tr>
<tr>
<td>WELD DRAWINGS</td>
<td>40</td>
<td>Minimum requirements for Blueprint: Title Block, Proper Critical Dimensions, No Tolerances, Proper Welding Symbols, Proper Finishing Symbols, Proper Views to Fabricate the project, Proper Sub Assembly Drawings</td>
</tr>
</tbody>
</table>
| Proposal        | 10     | Your team is to submit (1) proposal for a project that is worthy of being fabricated at national’s. It must support humanity in some way. Bring your proposal with you to turn in with your prints – format is of your choice.  
  - Provide as much information as possible to describe the project  
  - Explain how this project would support humanity  
  - Explain why there is a need  
  - IF you have contact information for someone with direct experience with this need and that person wants to be contacted please provide that. Their information will only be used by the Welding Fabrication committee to make contact.  
  - Label as “Proposal for Future Projects” |
| WRITTEN TEST    | 100    | The 3 individual test scores are averaged for your team’s total score |

### Items that must be supplied by Teams:

- All Personal Protective Equipment
- Hearing and/or ear protection
- Welding helmet with appropriate filter plate/lens and protective cover plate/lens in a flip or slide front. Auto darkening shields are permissible
- Spare spatter and filter lenses/plates for arc welding helmet and oxyacetylene goggles
- Blueprints – See “Blue print requirements”
- Résumé
- Teams may bring own hand tools but are not needed to complete the project.
  - See Welding Fabrication National Standards for more information
• **Tools Supplied by Committee to each team:**
  - Welding Machines
    - Millermatic 350P used for GMAW/FCAW
    - Lincoln Aspect 375 for SMAW/GTAW
  - Environmental Equipment
    - 1 Environmental Extraction Unit per team (Miller Electric or Lincoln Electric)
  - Harris Calorific OFC Pipeliner Kit
  - Tungsten Electrodes
  - Materials from Bill of Materials
  - Two 4 ½” Metabo grinders
  - 3 cutting disks, 3 grinding disks and 3 sanding disks per team
  - Oxyacetylene goggles
  - Grinding face shields
  - Tool boxes consisting of the following tools:

<table>
<thead>
<tr>
<th>Tool</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculator</td>
<td>1</td>
</tr>
<tr>
<td>Clamp - 12” Bar Type</td>
<td>1</td>
</tr>
<tr>
<td>Clamp - 24” Bar Type</td>
<td>1</td>
</tr>
<tr>
<td>Hammer - 3# (Short Handle)</td>
<td>1</td>
</tr>
<tr>
<td>Hammer – Chipping</td>
<td>2</td>
</tr>
<tr>
<td>Level - 24” Bubble Type</td>
<td>1</td>
</tr>
<tr>
<td>Measuring Tape - 25’</td>
<td>3</td>
</tr>
<tr>
<td>Pliers - Channel Lock (Large)</td>
<td>1</td>
</tr>
<tr>
<td>Pliers - Channel Lock (Small)</td>
<td>1</td>
</tr>
<tr>
<td>Pliers - Diagonal Wire Cutters</td>
<td>1</td>
</tr>
<tr>
<td>Pliers - Lineman's (Large)</td>
<td>1</td>
</tr>
<tr>
<td>Pliers - Needle Nose (Large)</td>
<td>1</td>
</tr>
<tr>
<td>Pliers - Slip Joint (large)</td>
<td>1</td>
</tr>
<tr>
<td>Pliers - Slip Joint (Small)</td>
<td>1</td>
</tr>
<tr>
<td>Screwdrivers - Flat Blade (Various Sizes)</td>
<td>5</td>
</tr>
<tr>
<td>Screwdrivers - Phillips Head (Various Sizes)</td>
<td>3</td>
</tr>
<tr>
<td>Square – Framing</td>
<td>1</td>
</tr>
<tr>
<td>Tin Snips</td>
<td>1</td>
</tr>
<tr>
<td>Vise Grips - 10WR (Regular Type)</td>
<td>1</td>
</tr>
<tr>
<td>Vise Grips - 11R (Short C-Clamp Type/Without feet)</td>
<td>2</td>
</tr>
<tr>
<td>Vise Grips - 11SP (Short C-Clamp Type/With feet)</td>
<td>2</td>
</tr>
<tr>
<td>Vise Grips - 18SP (Long C-Clamp Type/With feet)</td>
<td>2</td>
</tr>
<tr>
<td>Wrench - 8” Adjustable</td>
<td>1</td>
</tr>
<tr>
<td>Wrench - Set - Combination 1/4” to 7/8” (10 pcs)</td>
<td>1</td>
</tr>
</tbody>
</table>

• **Other tools:**
  - N/A for 2019
### Safety:
- Face shields **must** be worn while grinding
- Helmets or oxyacetylene goggles **must** be worn while cutting
- Welding jackets **must** be worn while welding
- **Safety glasses must be worn at all times**
- **Hearing protection must be worn at all times**
- Only one welding machine may be used at time as there is only one piece of environmental equipment. Two grinders may be used in conjunction with the use of the one welding machine.
- Grinding sparks on the welding equipment and/or other people will result in a deduction in points
- Environmental equipment **must** be used at all times when welding. Points will be deducted for improper use.

### Other Information:
- When fabricating, sometimes parts and/or steel pieces are not supplied with the correct dimensions. If the dimensions are different than your prints, “on the job” corrections must be made. Notify the judges if materials are not the correct dimensions prior to any material prep. The judges will take that into consideration when judging.
- The oral interview will be conducted randomly during the 6-1/2 hour fabrication part of the competition.
- A team picture will be taken during your competition
  - Pictures will be posted in Contest Updates on the SkillsUSA website.
- All projects will be donated
- **Teams are not permitted to bring any power tools, templates or additional material.**
  - Decimal / Fraction conversion cards are permitted
- Possession or use of any electronic communication devices are not allowed in the contest area at any time.
- A collection box will be available to hold cell phones labeled with painters tape and team #
- Cell phones may not be substituted for calculators!
FABRICATION & MANDATORY STOP POINTS

As mentioned in the original contest update, teams need to plan for stop points (inspection points). This year you’ll have an opportunity to earn (100) Fabrication points by following designated stop points. There are (4) required stops each worth up to (25) points.

Note: Additional 50 points (25 points each for appearance and functionality) to be graded later. For total fabrication points of 150

These stop points will only be for pre welded (tacked) assemblies and will not dictate how your team executes the rest of the build. As an example you will need to fabricate specific subassemblies in a particular order however it’s each teams choice how they want to prepare the material; mark-out, cut, grind and form material in any preparation your team determines to be best.

This is how the points will be earned:

If your team stops and gets a fabrication judge at the required stop point, after tacking the assembly and prior to complete welding, you will earn points. If you don’t stop you earn 0 points

If your tacked assembly passes the check you earn additional points. If you don’t pass and rework is required you lose points for each rework attempt up to 3x.

If additional rework is required after your teams third attempt you will need to complete the rework prior to proceeding and will not be able to earn any points for that particular stop.

NOTE: After a team has exhausted all chances of earning points at each stop, judges are permitted to give instruction on how to complete the task so that competitors can learn and still participate in the build.

Stop 1: Front Frame SA04 (Sheet 12 on print)
- Frame length & width dimensions
- Frame square
- Tabs correct location w/ 0.50” offset for plywood
- Floor bars w/ 0.229 spacing for floor plate
- Dimensions for door hinge
- 3.5” legs

Stop 2: Back Frame SA03 (Sheet 11 on print)
- Frame length & width dimensions
- Frame square
- Tabs (x14) correct location w/ 0.50 offset for plywood
- Floor bars w/0.229 spacing for floor plate
- 3.5” legs

Stop 3: Complete Frame SA01 (Sheet 4 on print)
- Complete frame square on both sides
- Floor bars align

Stop 4: Door Frame SA05 (Sheet 13 on print)
- Door Frame square
- Chute cross bar not installed
Safety!

- When moving sub assembled frames (front and back frame) (2) people are required
- When moving the completed frame or box (3) people are required

Additional Activities

- Competitors not competing Wednesday and Thursday will be asked to help install plywood on the completed boxes.
  - Schedules will be flexible for this
- On Friday 6/21 we have a tour setup through WaterStep to see their operations.
  - Tour 9:30am – 12pm.
    - To catch the bus be at the Lobby, Stop#15 no later than 9:15
  - This is voluntary, but highly recommended for competitors so they can see what their efforts will be supporting
    - Parents/Advisors, etc. are welcome as well.
NOTES:

1. LOCATE PLYWOOD PANELS INTO POSITION, THEN SPOT WELD HOLE IN VARIOUS PLYWOOD FOR ATTACHING HARDWARE.
   (TO BE COMPLETED AFTER CONSTRUCTION.)

2. DO NOT WELD DONATION BOX TO SIDE FACING PLYWOOD PANELS.

3. PAINT INTERIOR SURFACES AND SEAM JOINTS AS NEEDED.
   (TO BE COMPLETED AFTER CONSTRUCTION.)

4. DRAWN TO REFLECT況UNION-L, V300-16 & V300-25 X-TO-AWS X-TO-AWS X-TO-AWS X-TO-AWS.