Top Wrench Competition

Since 1991

A PARTNERSHIP IN VOCATIONAL EDUCATION

Hosted by The Crown College

DATE: APRIL 3, 2025

❖A vocational education competition for area high schools❖

Featuring:

- **Static Engine Challenge**
- **Computer Control Car Challenge**
- **Pit Crew Challenge**
- **Welding/Fabrication Contest**
- **Technical Welding Contest**
- **Live Welding Contest**
- **Custom Paint Contest**
- **Valve Cover Race**
- **Classic Custom Automobiles & Interactive Displays**

All schools compete for prizes and scholarships!

Contact:

Maria Richardson 865-380-0856 Email: topwrenchtn@gmail.com

topwrenchtn

@topwrenchcompetition
#topwrenchcompetition2023

TOP WRENCH COMPETITION DETAILS:

- Top Wrench Competition will be held at The Crown College, 2307 W Beaver Creek Dr, Powell, TN 37849.

- Opening ceremonies will begin at 8:30 AM on April 3. Please make every effort to arrive on time! Closing ceremonies will be held at 2:00 PM.

- All schools that wish to participate will have to register with Maria Richardson no later than: FEBRUARY 14, 2025. Call 865.380.0856 or email: topwrenchtn@gmail.com.

- T-shirts will be provided for all participating students and teachers. T-shirt sizes need to be submitted no later than FEBRUARY 14. (If orders are not received on time, then t-shirts will not be provided).

- Each school is authorized *only one team* per event for Pit Crew Challenge, Engine Start Challenge, Computer Control Challenge, Valve Cover Race and Live Welding Challenge.

- Each school is authorized *only 2 entries* in the Technical Welding Challenge.

- Each school is authorized *up to 5 entries* in the Custom Paint and Welding/Fabrication Contests.

- All attending students, chaperones and participants will be required to sign the attached RELEASE, WAIVER AND CONSENT FORM. On competition day, you MUST turn in your consent form at the Registration Table upon entering the event.

- Each school needs to provide student chaperones for the day. There should be one chaperone (a teacher or parent) per 12 students.

- Meals will be served on location at a cost of $7.00 per person.

COMPETITION RULES ARE ATTACHED.
THEY ARE ALSO AVAILABLE ON OUR WEBSITE:
www.topwrenchcompetition.com

TOP WRENCH STUDENT RELEASE, WAIVER AND CONSENT FORM

I, as parent or legal guardian of_____, a minor, do hereby consent that my child or legal ward be permitted to participate in Top Wrench Competition and Crown College campus tour, located at 2307 W Beaver Creek Dr, Powell, TN 37849.

In consideration of my child's or ward's participation in the Top Wrench Competition and Crown College's campus tour, I hereby fully release Top Wrench and Crown College, their officers, employees and agents from any and all claims for injury or damages which may result from their event participation and campus tour at Crown College.

I further hereby waive any right to bring any claim, lawsuit or action at law or equity against Top Wrench and/or Crown College or any of their officers, employees or agents arising out of the competition events or tour of Crown College campus.

I acknowledge that my child's or ward's participation in these activities is voluntary, and knowingly assume all risk involved.

I also grant Top Wrench and Crown College my permission to photograph and/or videotape my child during Top Wrench activities. These photographs/videos may be used in print publications, online publications, presentations, websites, flyers and social media. I also understand that no royalty, fee or other compensation shall become payable to me by reason of such use.

Signature_____ Date_____

Print Name_____

TOP WRENCH <u>TEACHER/VOLUNTEER/CHAPERONE</u> RELEASE, WAIVER AND CONSENT FORM

I,_____, do hereby consent that I am participating in Top Wrench Competition and Crown College campus tour, located at 2307 W Beaver Creek Dr, Powell, TN 37849.

In consideration of my participation in the Top Wrench Competition and Crown College's campus tour, I hereby fully release Top Wrench and Crown College, their officers, employees and agents from any and all claims for injury or damages which may result from my event participation and campus tour at Crown College.

I further hereby waive any right to bring any claim, lawsuit or action at law or equity against Top Wrench and/or Crown College or any of their officers, employees or agents arising out of the competition events or tour of Crown College campus.

I acknowledge that my participation in these activities is voluntary, and knowingly assume all risk involved.

I also grant Top Wrench and Crown College my permission to photograph and/or videotape me during Top Wrench activities. These photographs/videos may be used in print publications, online publications, presentations, websites, flyers and social media. I also understand that no royalty, fee or other compensation shall become payable to me by reason of such use.

Signature_____ Date_____

Print Name_____

TOP WRENCH COMPETITION RULES:

ENGINE START CHALLENGE RULES:

Team size shall consist of no fewer than 2 students and a maximum of 5 students.

1. The competition judges will review the safety briefing prior to each school team attempt. Questions concerning the rules of the competition will be discussed prior to the competition.
2. All teams will be presented with a bug to overcome. Each team might not necessarily be given the same bug, but each bug will have similar complexity.
3. Each team will have 10 minutes to "de-bug" the engine. The team that properly de-bugs and starts the engine in the least amount of time wins the competition. In case of a tie, the judges will be rating each school for spirit, teamwork, knowledge and sportsmanship.
4. Each team that successfully starts the engine will run the engine for 5 seconds.
5. If no team starts the engine in the time allotted, the judges will determine the winner based on school spirit, teamwork, knowledge and sportsmanship.
6. If an unsafe act occurs, the team will be stopped, and the clock will continue to run, until the infraction is corrected.
7. Tools will be provided in the competition area; however, teams may bring their own tools.
8. Spare parts will be available (not necessarily new or good).
9. The engine timing is set correctly and should not be adjusted.
10. The ignition system is the only system bugged. The system starts at the battery and ends at the plugs. The ignition switch wiring and spark plugs will not be tampered with.
11. The judge's decision is final!
12. No hints from instructors or audience are allowed during the competition.

Only the competing team of no more than five people will be allowed in the competition area at any time. (Classmates of the competing team will be allowed to silently observe.)

*** EVERYONE ELSE STAY CLEAR! ***

Helpful Information:

- Skills should include basic knowledge of electrical circuits, electrical testers (voltmeter-continuity tester), engine fundamentals, troubleshooting and testing.
- The fuel system will not be bugged.

Safety Briefing

- Safety glasses will be worn at all times, no exceptions. (ALL COMPETITORS WILL BE REQUIRED TO WEAR **THEIR OWN** SAFETY GLASSES. Due to health concerns, Top Wrench will no longer supply safety glasses for the competitors).
- Rings, metal bracelets, long dangling necklaces will not be worn in the competition area.
- Rude behavior, improper language, and arguing will not be tolerated, and could result in disqualification at the judge's discretion. Teamwork is encouraged.
- When it is decided that the engine is ready to start, team leader will call "Clear" and all team members will step back and the team leader will attempt to start the engine.

- Should the engine start and run properly for 5 seconds, then the competition is complete and the clock will be stopped.
- Should the engine not start, or start and not run properly, then diagnostics will resume, and the clock continues to run.
- If an unsafe act occurs, the team will be stopped, and the clock will continue to run, until the infraction is corrected.

COMPUTER CONTROL CHALLENGE RULES:

Team size shall consist of no fewer than 2 students and a maximum of 5 students.

1. Competition judges will give a safety briefing prior to each school team attempt.

2. The vehicle will have immediate code-generating bugs introduced into the computer system prior to each team attempt. Bugs will take no longer than 13 minutes to repair.

3. Tools and test equipment will be provided in the competition area; however, teams may bring their own tools and equipment.

4. The competition vehicle's hood will be lowered by a judge before the school team may enter the engine bay area.

5. Students will extract code information and inform the judge of extracted code prior to lifting the hood.

6. Once students believe they have corrected the code generating condition(s), the codes may be cleared and the engine started to ensure the code does not return.

7. If the code does not return, the competition is over and time will be stopped.

8. The team with the least amount of time to correctly repair the condition wins.

9. If no team clears the codes successfully, judges will determine the winner based on school spirit, teamwork, knowledge and sportsmanship.

10. Bugs (codes) will be of the same nature taking the same time to correct but may not be the same issue for each attempt so as to prevent cheating and allow competitions to be observed.

11. The judge's decision is final.

12. No hints from instructors or audience are allowed during the competition.

Only the competing team of no more than five people will be allowed in the competition area at any time. (Classmates of the competing team will be allowed to silently observe.)

*** EVERYONE ELSE STAY CLEAR! ***

Helpful Information:

- To prepare students for the computer control car competition, gasoline automobile electronic engine controls should be studied. Also study how to pull codes, identify, inspect, remove and replace electronic components, clear codes and run the now codeless engine to prove corrective actions were successful.

Safety Briefing

- Safety glasses will be worn at all times, no exceptions. (ALL COMPETITORS WILL BE REQUIRED TO WEAR **THEIR OWN** SAFETY GLASSES. Due to health concerns, Top Wrench will no longer supply safety glasses for the competitors).
- Rings, metal bracelets, long dangling necklaces will not be worn in the competition area.
- Rude behavior, improper language, and arguing will not be tolerated, and could result in disqualification at the judge's discretion. Teamwork is encouraged.
- When it is decided that the engine is ready to start, team leader will call "Clear" and all team members will step back and the team leader will start the engine.
- Should the engine start and run without codes, then the competition is complete and the clock will be stopped.
- Should the engine start and the codes return, then diagnostics will resume, and the clock continues to run.
- If an unsafe act occurs, the team will be stopped, and the clock will continue to run, until the infraction is corrected.

PIT CREW CHALLENGE RULES:

Team size shall consist of no fewer than 3 students and a maximum of 5 students.

1. Competition judges will read the safety briefing prior to each school team attempt. Questions concerning the rules of the competition will be discussed prior to the start of the competition.
2. All teams will use the tools and lug nuts that are provided.
3. Clock starts when the first team member crosses the start/finish line.
4. Clock stops after the last team member and all equipment (wheel, impact wrench and jack) is across the start/ finish line. Any discarded lug nuts will not be a concern.
5. Judges will make sure all lug nuts are on and tightened after the clock stops. If a loose or missing lug nut is found, the team will be allowed to correct the problem and the time to correct the problem will be added to the previous time.
6. In the event of equipment failure (stripped lug nut, impact wrench or jack failure) the team will be allowed to restart the competition after the problem is corrected. Extra lug nuts, studs and tools will be in the area and used as needed.
7. A team will be disqualified if any team member performs an unsafe act.

Safety Briefing

- All competitors must wear safety glasses
- Competing teams and equipment will start in a defined area
- All team members should wear their own safety glasses
- No part of any team member's body can be under the car at any time
- No equipment, part or tool can be thrown or handled in an unsafe manner.

VALVE COVER ELIMINATION RACE RULES:

Valve Cover Racing is similar in concept to the commonly known "Pinewood Derby," utilizing gravity-powered racers competing in head-to-head eliminations on a two-lane track. There is a ton of information on the internet about how to build a valve cover racer. Be creative!

Team size shall consist of 1 student.

1. Must use small block Chevrolet valve cover.
    - Must be short type only.
    - Can be steel or aluminum.
    - Must be stock in appearance (no wings, etc.).
    - Maximum width 8 inches including tires or wheels.
    - Maximum weight 5 pounds.
    - Original mounting flange cannot be modified.
    - Must use 4 wheels.
    - Skateboard wheels, Hard Drive Disks and CD are examples that can be used as wheels.

2. One racer per school.
3. Each valve cover must pass tech inspection.
4. Scales will be provided. Be prepared to add or remove weight.
5. Each valve cover will be allowed three runs to tune before eliminations.
6. No lane hopping or interference with competition.
7. First infraction - rerun; second infraction - disqualification. Which means one rerun for the entire event.
8. If judges rule a tie, then reruns will be conducted until a winner is decided. Reruns will be in opposite lane.
9. Must finish on wheels and in own lane.
10. The judge’s decision is final.
11. Entrants are responsible for staging their own Valve Cover entry.
12. To continue with the Top Wrench theme, show school spirit and have fun!
13. Unsportsmanlike conduct will result in disqualification (& heavy shame).

CUSTOM PAINT CONTEST RULES:

Students demonstrate painting techniques on mailboxes, hoods, door panels, fenders, or an entire vehicle which would also be entered into the car show.

Team size shall consist of 1-2 students. Up to 5 entries per school are allowed.

1. Projects need to be new. Do not submit a project used in a previous Top Wrench competition.
2. Mailbox must be metal and have smooth sides (no ripples).
3. Any colors may be used (solid, metallic, pearl, candies, three stage, etc.).
4. Airbrush may be used.
5. No obscenities, school logos, alcohol, tobacco, pro-drug, racial or gang-related content allowed.
6. Dipped paint applications and graphics shall not be utilized.

Custom Paint will be judged on these areas:

A. (50 points) - **Quality of work performed** (no runs, sags, dirt or any other imperfections)
B. (25 points) - **Creativity** (how well project was planned out and artwork)
C. (25 points) - **Correct procedures taken to complete project** The steps taken to complete project must be printed out on 8.5" x 11" paper and displayed with the entry in a folder/binder. The binder must include a statement signed by the student's instructor affirming the student completed the project 100% on their own. [Sample binder outline included below].

Binder Outline for Custom Paint Contest:

A. Student Name, Grade and School

B. Instructor's Name

C. Materials used to create entry

D. Equipment used to complete entry

E. Basics steps utilized to complete entry

F. Signed statement by instructor:

I, ___(Teacher's Name)___ verify that my student, ____(Student's Name)_____completed this project 100% on his/her own.

WELDING/FABRICATION CONTEST RULES:

Students demonstrate welding techniques on an original project.

Team size shall consist of 1-2 students. Up to 5 entries per school is allowed.

1. Projects need to be new. Do not submit a project used in a previous competition.
2. Project dimensions are limited to approximately the size of a shoe box. Project should be no larger than 18 inches long, 12 inches high and 12 inches wide.
3. Project must be made of steel (new and old material are acceptable).
4. All welds must be exposed. No paint.
5. Project must show at least 3 types of weld: butt, corner, edge, lap, tee.
6. Project theme must be auto-related (no weapons, knives, spears, etc.).

Welding/fabrication contest will be judged on these areas:

D. (50 points) - **Quality of work performed**
E. (25 points) - **Creativity**
F. (25 points) - **Correct procedures taken to complete project** The steps taken to complete project must be printed out on 8.5" x 11" paper and displayed with the entry in a folder/binder. The binder must include a statement signed by the student's instructor affirming the student completed the project 100% on their own. [Sample binder outline included below].

Binder Outline for Welding/Fabrication Contest:

G. Student Name, Grade and School

H. Instructor's Name

I. Materials used to create entry

J. Equipment used to complete entry

K. Basics steps utilized to complete entry

L. Signed statement by instructor:

I, ___(Teacher's Name)___ verify that my student, ____(Student's Name)_____completed this project 100% on his/her own.

TECHNICAL WELDING CONTEST RULES:

Students demonstrate technical welding techniques. There is one Welding Technical Challenge that students can enter:

1. **GTAW Fabrication Challenge**

***Please see the 5 attachments/drawings for challenge parameters following this page.**

Team size shall consist of 1 - 3 students.
Each school can submit up to 2 entries for this challenge.

1. Entries need to be new. Do not submit an entry used in a previous competition.
2. All welds must be made in position.
3. New and old steel materials are acceptable.
4. Each entry must be submitted with a statement signed by the student's instructor affirming the student(s) completed the project 100% on their own.

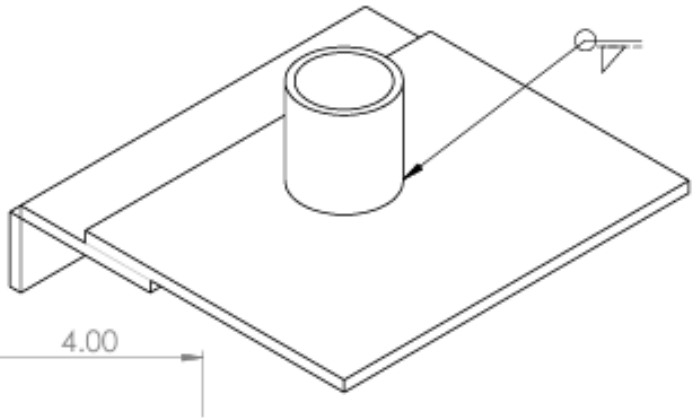
Technical Welding Contest will be judged on these areas:

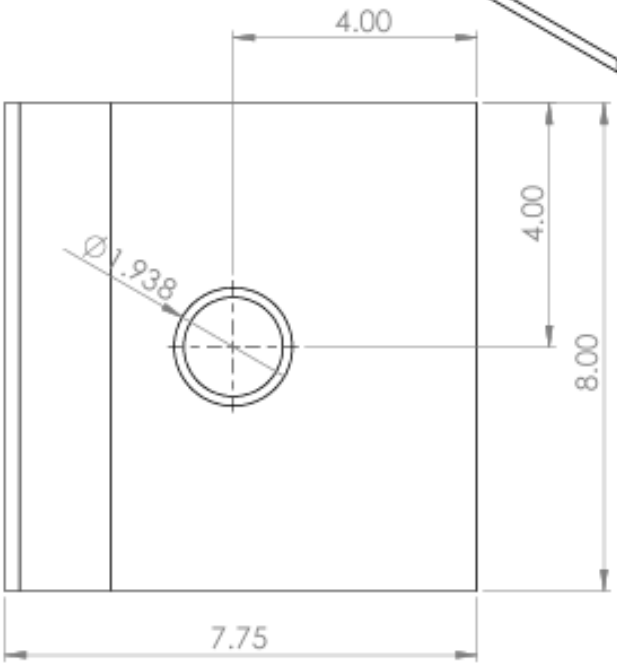
Each entry will be judged by industry standards. The overall Top 3 entries will receive trophies.

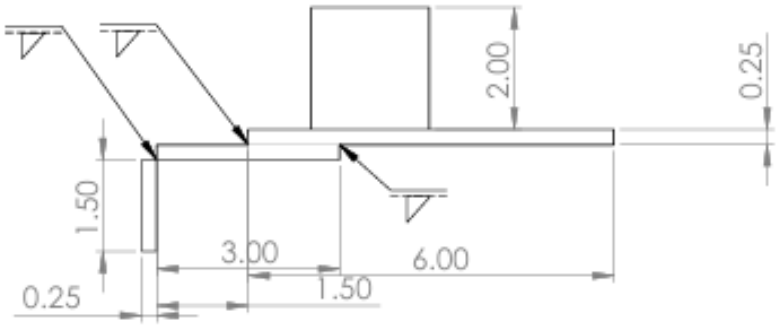
A. Undercut – no undercut greater than 1/32" (7 points)
B. Overlap/Coldlap – no overlap/coldlap (5 points)
C. Underfill – no underfill (5 points)
D. Arc Strikes – no arc strikes (5 points)
E. Incomplete Fusion – no incomplete fusion (5 points)
F. No Porosity – no porosity greater than 1/16" and no cluster porosity exceeding ½" in any 12" of weld or test plate (5 points)
G. Slag Inclusions – no slag inclusions (5 points)
H. Appearance – overall visual appearance/workmanship (6 points)
I. Face Reinforcement – face reinforcement not to exceed 1/8" (7 points)
J. Fit-up – Judges will inspect proper alignment, joint fit-up and the welder's ability to fit two or more components together with precision, ensuring that the edges, surfaces and interfaces form a seamless connection. (50 points)

*Must include a statement signed by the student's instructor affirming the student(s) completed the project 100% on their own.

TECHNICAL WELDING: GTAW FABRICATION CHALLENGE - Pg 1



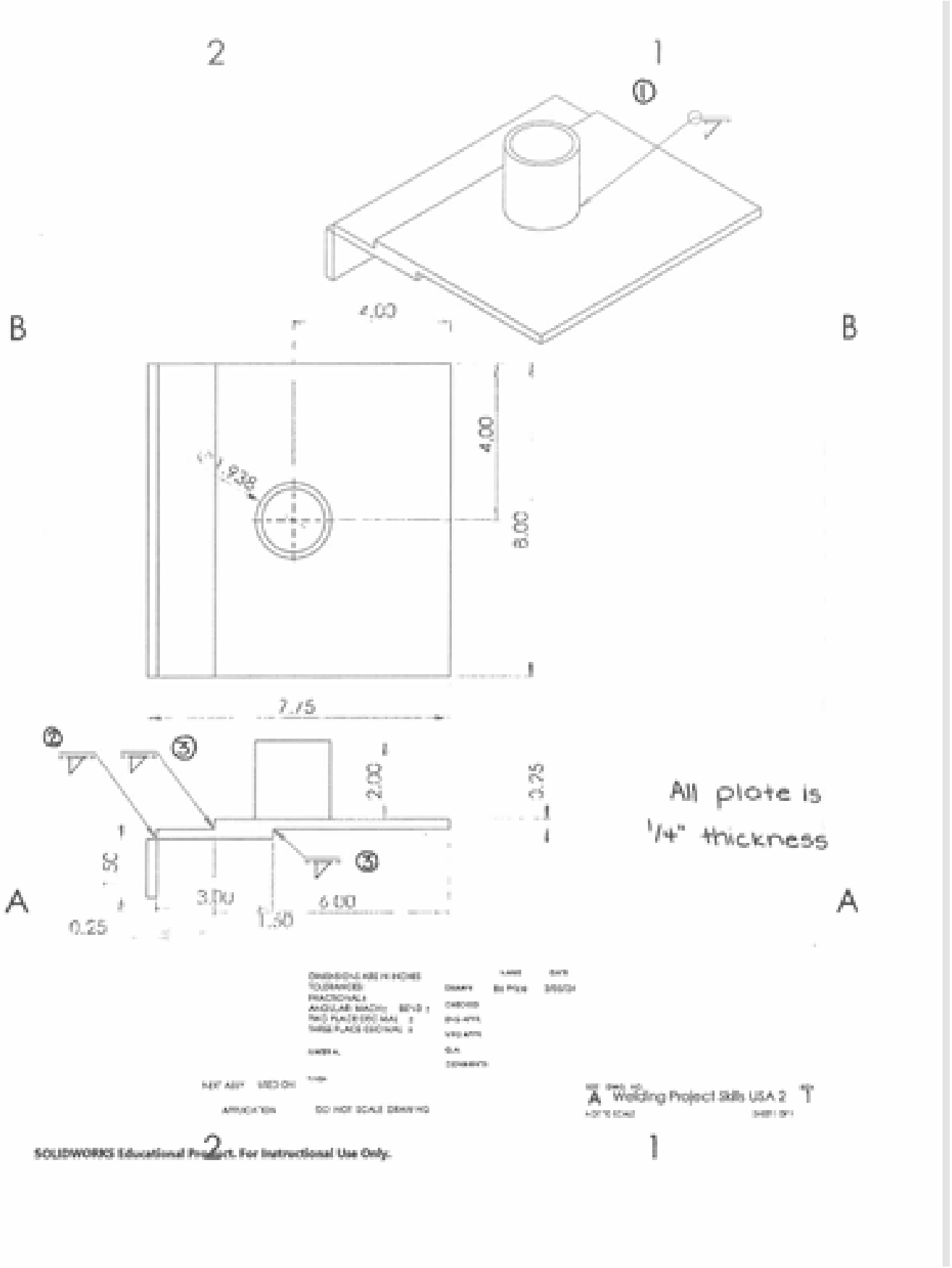




		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±		NAME	DATE
			DRAWN	Bo Price	2/05/24
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		MATERIAL	Q.A.		
			COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

SIZE A | DWG. NO. Welding Project Skills USA 2 | REV

NOT TO SCALE | SHEET 1 OF 1



TECHNICAL WELDING: GTAW FABRICATION CHALLENGE - Pg 3

Name _____

Welding Process:

Type: GTAW Polarity: DCEN
Transfer Mode: N/A

JOINT DESIGN USED
Type: Pad Plate

Backing: No

Root Opening: N/A

Root Face Dimension: N/A

Groove Angle: N/A
Back Gouging: N/A
Method: N/A

BASE MATERIAL
Material Spec.: ASTM

Type or Grade: A36

Thickness: X" & 2" pipe Fillet: 3 passes Size: X"

Filler Metal

AWS Specification: A5.18

AWS Classification: ER70S-6

Diameter: 1/8th
Shielding: Argon (20-25 CFH)

TECHNIQUE
Stringer, Weave Bead, Other: Stringer

Multi-pass or Single Pass (per side): 2 Passes
Pass 1 Autogenous (Fuse)
Pass 2 with Filler
Pass 3 with Filler

Number of Electrodes: Undefined

Interpass Cleaning: yes

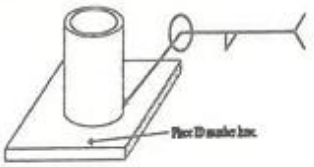
Cleaning Method: Wire Brush

This will be welded in flat, horizontal, vertical and overhead.
All Welding is to be done from one side.

WELDING PROCEDURE

Pass	Technique	Filler Metals: Class	Filler Metals: Diameter	Current: Polarity	Current: AMPS	Travel Speed	Volt or Trim
1	Autogenous	N/A	N/A	DCEN	90-120	5-8 IPM	N/A
2	Weave/Stringer	ER70S-6	1/8th	DCEN	110-140	4-6 IPM	N/A
3	Weave	ER70S-6	1/8th	DCEN	110-140	4-6 IPM	N/A

Joint Details



2" schedule 40 pipe

Name _____

Welding Process:

Type: SMAW Polarity: DCEP

Transfer Mode: N/A

JOINT DESIGN USED

Type: Corner Joint

Backing: No

Root Opening: N/A

Root Face Dimension: N/A

Groove Angle: N/A

Back Gouging: N/A

Method: N/A

BASE MATERIAL

Material Spec.: ASTM

Type or Grade: A36

Thickness: ¼" or 3/8"

Size: refer to blueprint

All metal will be cleaned and prepared properly with a grinder.

Shielding Gas: N/A

All Welding is to be done from one side.

AWS Specification: A5.1

AWS Classification: 7018

Diameter: 3/32nd & 1/8th

TECHNIQUE

Stringer, Weave Bead, Other: 1F Weave

Multipass or Single Pass: 2-3 passes weave

Number of Electrodes: Undefined

Interpass Cleaning: Yes

Cleaning Method: Chipping Hammer and Wire Brush

Cleaning by grinding is also permitted.

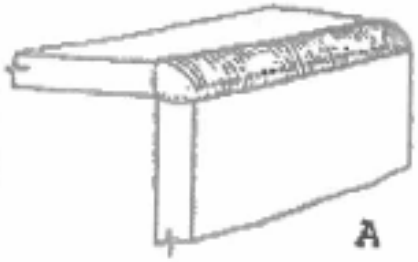
This will be welded in all positions. (Refer to print or directions)

Filler Metal

WELDING PROCEDURE

Pass	Technique	Filler Metals		Current		Travel Speed	Volt or Trim
		Class	Diameter	Polarity	AMPS		
1-	Root	7018	3/32" or 1/8"	DCEP	70-95 110-140	6-8 IPM	N/A
2	Hot/Fill pass	7018	3/32nd or 1/8th	DCEP	70-95 110-140	7-9 IPM	N/A
3	Fill or Cover pass	7018	3/32nd or 1/8th	DCEP	70-95 110-140	7-9 IPM	N/A

Joint Details



*** The welder will fill up the fillet weld with no excessive build up, underfill or porosity***

Name _____

Welding Process:

Type: SMAW Polarity: DCEP

Transfer Mode: N/A

JOINT DESIGN USED

Type: Lap Joint (Fillet)

Backing: No

Root Opening: N/A

Root Face Dimension: N/A

Groove Angle: N/A

Back Gouging: N/A

Method: N/A

BASE MATERIAL

Material Spec.: ASTM

Type or Grade: A36

Thickness: ¼" or 3/8"

Size: refer to blueprint

All metal will be cleaned and prepared properly with a grinder.

Shielding Gas: N/A

All Welding is to be done from one side.

AWS Specification: A5.1

AWS Classification: 7018

Diameter: 3/32nd & 1/8th

TECHNIQUE

Stringer, Weave Bead, Other:

1F weave

Multipass or Single Pass:

2-3 passes weave

Number of Electrodes: Undefined

Interpass Cleaning: Yes

Cleaning Method: Chipping Hammer and Wire Brush

Cleaning by grinding is also permitted.

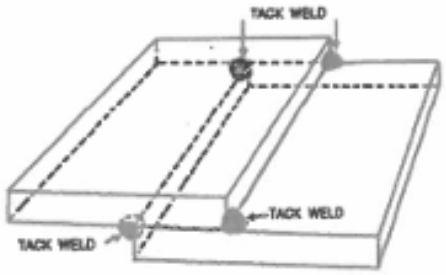
This will be welded in all positions. (Refer to print or directions)

Filler Metal

WELDING PROCEDURE

Pass	Technique	Filler Metals Class	Filler Metals Diameter	Current Polarity	Current AMPS	Travel Speed	Volt or Trim
1-	Root	7018	3/32" or 1/8"	DCEP	70-95 110-140	6-8 IPM	N/A
2	Hot/Fill pass	7018	3/32nd or 1/8th	DCEP	70-95 110-140	7-9 IPM	N/A
3	Fill or Cover pass	7018	3/32nd or 1/8th	DCEP	70-95 110-140	7-9 IPM	N/A

Joint Details



** The welder will fill up the fillet weld with no excessive build up, underfill or porosity***

LIVE WELDING CONTEST RULES:

Students demonstrate technical welding techniques on Top Wrench Competition Day. There is one individual Welding Technical Challenges that students can enter:

1. **3F SMAW Vertical Up Challenge**

***Please see the 3 attachments/drawings for challenge parameters following this page.**

Team size shall consist of 1 student.

Each school can enter up to 1 student. (**Top Wrench recommends that each school hold their own in-house competition prior to Top Wrench Competition and bring their best welding student to compete with us on competition day**).

1. Students need to bring their own weld pieces to Competition Day for each challenge entered.
2. Weld pieces need to be correctly cut according to the attachment titled "LIVE WELDING: 3F SMAW VERTICAL UP CHALLENGE JOINT DRAWING - Pg 3"
3. New and old steel materials are acceptable.
4. Live Welding Challenges will be completed in TCAT's Mobile Welding Lab.
5. Each student will be issued a predetermined amount of welding rods per challenge.
6. Judges have authority to disqualify competitors based on violations of safety rules and inappropriate use of equipment.
7. Judge's decision is final.

Live Welding Contest will be judged on these areas:

Each entry will be judged by industry standards. The overall Top 3 entries will receive trophies.

A. Undercut – no undercut greater than 1/32" (7 points)
B. Overlap/Coldlap – no overlap/coldlap (5 points)
C. Underfill – no underfill (5 points)
D. Arc Strikes – no arc strikes (5 points)
E. Incomplete Fusion – no incomplete fusion (5 points)
F. No Porosity – no porosity greater than 1/16" and no cluster porosity exceeding ½" in any 12" of weld or test plate (5 points)
G. Slag Inclusions – no slag inclusions (5 points)
H. Appearance – overall visual appearance/workmanship (6 points)
I. Face Reinforcement – face reinforcement not to exceed 1/8" (7 points)
J. Fit-up – Judges will inspect proper alignment, joint fit-up and the welder's ability to fit two or more components together with precision, ensuring that the edges, surfaces and interfaces form a seamless connection. (50 points)

Safety Briefing

The Live Welding Challenge will take place in the Tennessee College of Applied Technology's Mobile Welding Lab. Their safety briefing is as follows:

For Welders:

1. Safety Glasses: All individuals entering the Mobile Welding Lab must wear ANSI-approved safety glasses. If you do not have your own, glasses can be borrowed on-site. Safety glasses must be worn at all times within the lab.

2. Pants: Long pants made of 100% cotton (such as jeans or work pants) are required during any welding or grinding activities. Pajama pants, sweatpants, leggings, and shorts are not allowed.

3. Close-Toed Shoes: Steel-toed or safety-toed boots are preferred, but closed-toe shoes are acceptable. Slipper-type shoes such as Crocs or HEYDUDEs are not permitted.

4. Welding Jacket: A welding jacket or a long-sleeved shirt made of 100% cotton must be worn during all welding or grinding activities.

5. Gloves: Welding gloves or leather work gloves are required while welding or handling metal.

6. Angle Grinders: A face shield and safety glasses must be worn during any grinding activities. An auto-darkening welding helmet in grind mode is an acceptable alternative to a face shield. Additionally, all angle grinders must have their guards in place at all times. There will be zero tolerance for anyone using a grinder without a guard; such individuals will be asked to leave the Mobile Welding Lab.

7. Housekeeping: The Mobile Welding Lab is a compact space, and good housekeeping practices are essential to maintain a safe working environment. Please be mindful of cables, cords, metal, and any other trip hazards on the floor, and work as neatly as possible.

8. Welding Curtains: Always close welding curtains when welding or grinding.

For Spectators:

1. Safety Glasses: Spectators must wear safety glasses while in the Mobile Welding Lab. Safety glasses can be borrowed if needed.

2. Awareness of Hazards: Be vigilant regarding trip hazards while in the lab.

3. Welding Arc Protection: Spectators must not look directly at the welding arc without a welding helmet, as this can cause serious eye injury. Welding helmets are available to borrow if necessary.

LIVE WELDING: 3F SMAW VERTICAL UP CHALLENGE - Pg 1

Welding Process:

Type: SMAW Polarity: DCEP
Transfer Mode: N/A

JOINT DESIGN USED

Type: Fillet (T-Joint)

Backing: No

Root Opening: N/A

Root Face Dimension: N/A

Groove Angle: N/A
Back Gouging: N/A
Method: N/A

BASE MATERIAL

Material Spec.: ASTM

Type or Grade: A36

Thickness: ¼" Groove: N/A Fillet: Double Fillet

Filler Metal

AWS Specification: A5.1

AWS Classification: 7018

Diameter: 3/32nd or 1/8th

TECHNIQUE

Stringer, Weave Bead, Other: Stringer Beads for 2F, 3F & 4F

Multi-pass or Single Pass (per side) multi-pass

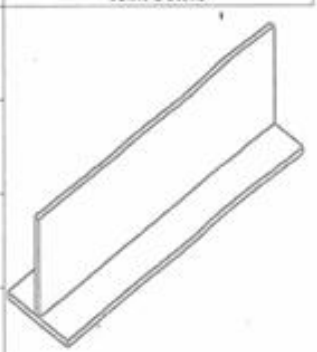
Number of Electrodes: Undefined

Interpass Cleaning: yes

Cleaning Method: Chipping Hammer and Wire Brush

This weld will be done in the 2F, 3F & 4F positions.
All Welding is to be done from one side.

WELDING PROCEDURE

Pass	Technique	Filler Metals		Current		Travel Speed	Volt or Trim	Joint Details
		Class	Diameter	Polarity	AMPS			
1	Stringer	7018	3/32nd or 1/8th	DCEP	70-95 or 110-140	6 IPM – 7.5 IPM	N/A	
2	Stringer	7018	3/32nd or 1/8th	DCEP	70-95 or 110-140	6 IPM-7.5 IPM	N/A	
3	Stringer	7018	3/32nd or 1/8th	DCEP	70-95 or 110-140	6 IPM – 7.5 IPM	N/A	
4	Stringer	7018	3/32nd or 1/8th	DCEP	70-95 or 110-140	6 IPM-7.5 IPM	N/A	

LIVE WELDING: 3F SMAW VERTICAL UP CHALLENGE - Pg 2

5	Stringer	7018	3/32nd or 1/8th	DCEP	70-95 or 110-140	6 IPM-7.5 IPM	N/A
6	Stringer	7018	3/32nd or 1/8th	DCEP	70-95 or 110-140	6 IPM-7.5 IPM	N/A

There shall be no cracks and no incomplete fusion. There shall be no incomplete joint penetration in groove welds except as permitted for partial joint penetration welds.

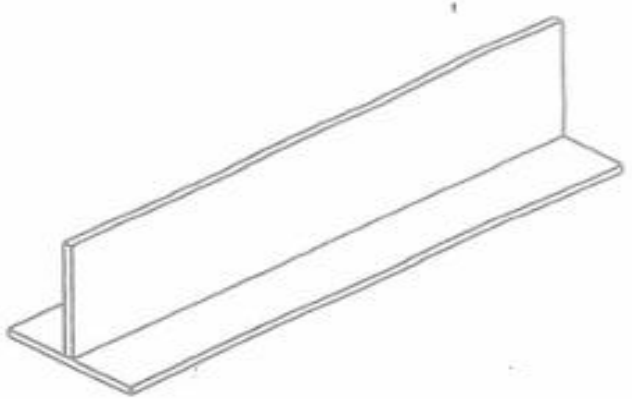
The test supervisor shall examine the weld for acceptable appearance and shall be satisfied that the welder is skilled in using the process and procedure specified for the test.

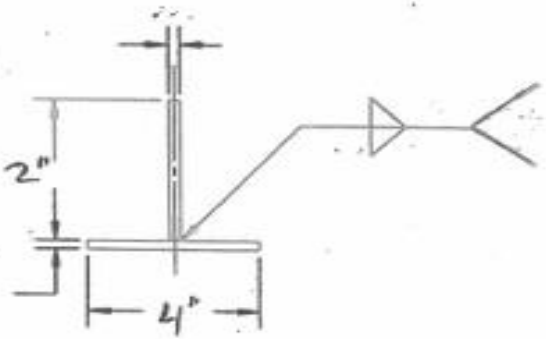
Undercut shall not exceed the lesser of 10% of the base metal thickness or 1/32 in. (0.8 mm).

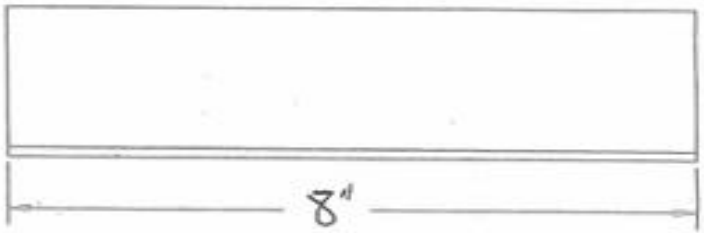
The frequency of porosity shall not exceed one in each 4 in. (100 mm) of weld length, and the maximum diameter shall not exceed 3/32 in. (2.4 mm).

Welds shall be free from overlap.

LIVE WELDING: 3F SMAW VERTICAL UP CHALLENGE JOINT DRAWING - Pg 3







Process
SMAW & GMAW

Position
3F & 4F

NAME DATE TITLE:
DRAWN BY
CHECKED BY
MATERIAL
WELD 1
SIZE DWG. NO. REV
A WELD 1
DO NOT SCALE DRAWING SCALE 1:6 SHEET 1 OF 1

1/4" thickness

Top Wrench Groat Morris “Mark” Callaway III Welding Student Scholarship Fund Application Information

What is it?

This fund was set up in honor of Mark Callaway, a welding student at Byington-Solway, who passed away on Dec 9, 2021. He loved welding and liked extra projects and was always willing to help other students. This fund will award yearly scholarships for high school seniors who are preparing to study at a technical school welding program.

Who is it for?

These yearly awards are for East Tennessee High School Seniors who have already enrolled in a post-graduate technical school welding program. They also must have attended the Top Wrench Competition in the year the scholarship is awarded.

What do students get?

This year, chosen applicants will receive a set of personal protective equipment that is required for all students entering a post-graduate technical school welding program.

Can I qualify to apply for this scholarship?

In order to apply, the following criteria must be met. The applicant must:

-Be a High School Senior attending a high school located in East Tennessee

-Be enrolled in a welding class during their Senior year of high school

-Already enrolled in a post-graduate technical school welding program

-Attend a Top Wrench Competition during the year the scholarship is awarded

WELDING STUDENT SCHOLARSHIP FUND APPLICATION PROCESS

****Students must apply by February 14, 2025****

The scholarship will be announced and awarded at the Top Wrench Competition on April 3, 2025.

Submit these 3 required application documents to Maria Richardson at topwrenchtn@gmail.com :

1. The *one-page application document* (Word docs preferred). See instructions below.

2. A teacher recommendation letter.

3. A document (or screenshot of an email) showing you have applied for a post-graduate technical school welding program.

*The above 3 documents can be attached as Word docs, .pdfs or screenshots.

Write a *one-page application document* including the following information:

-Name

-High School Name

-Welding Instructor Name

-Name of post-graduate technical school welding program to which you have already applied

-Write an explanation (no more than 200 words) of why welding is meaningful/important to you, and why you want to pursue it as a career.

The first **TOP WRENCH** Competition was held in 1991.
Though many things have changed, the basic principles
of the program remain the same:

- **Safety**
- **Building life skills**
- **Developing problem solving skills**
- **Initiating creative thinking**
- **Teamwork**
- **Communication and team building skills**
- **Career opportunities**
- **Building trust**
- **Paying attention to the details**
- **Responsibility**
- **Stress the importance of a drug free lifestyle**
- **Have Fun!**