

BOARD OF DIRECTORS

Steve King '26

President:
1155 S. Paoli Unionville Rd
Paoli, IN 47454
(812) 797-0059
kingstephen228@gmail.com

Gary Phillips '26

Vice President:
14800 N SR 167 N
Albany, IN 47320
(260) 251-4670
behere@netdirect.net

Bill Corey '27

Secretary:
3398S CR 225E,
Danville, IN 46122
(317) 919-1047
bc65925@gmail.com

Rob Hough '27

Membership Secretary
9790 N Sharp Bend Rd
Albany, IN 47320
(317) 517-0427
Rob.Hough@gmail.com

Jeff Reinhardt '24

2810 W. Riley
Floyd's Knobs, IN
(812) 949-7163
ptreeforge@aol.com

Dave Kunkler '24

Treasurer
20749 Lancaster Rd.
Branchville, IN 47514
(270) 945-6222
dwkunkler@yahoo.com

Daniel Sutton '25

Education Chairman:
504 Owen St.
Lafayette, IN 47905
(765) 586-1376
daniel@suttonindustrialarts.com

Bob Hunley '25

258N CR 800E
Sullivan, IN 47882
(812) 239-4767
roberthunley@yahoo.com

Librarian: Larry Rosentrader
8715 E. 375 N
Churubusco, IN 46723-9501
260-693-3267
lrosentrader@gmail.com

Editor: Bill Kendrick
1280 N 900 W
Seymour, IN 47274
(812) 569-1209
cmikendrick@gmail.com

Awards Chairman: Brad Weaver
2703 South Water Plant Road
Westport, IN 47283
(812) 371-8674
bweaverhlw@yahoo.com

THE FORGE FIRE

**The Newsletter of the Indiana Blacksmithing Association, Inc.
An Affiliate Of The Artists-Blacksmiths' Association of North
America, Inc.**

IBA is a Not For Profit Indiana Corporation recognized by the IRS under section 501(c)(3)

9:30 AM is the regular meeting time for IBA Hammer-Ins with beginner training available at 9:00 AM.
PLEASE MAKE SURE TO ASK FOR HELP!

If you would like an IBA membership application form, please contact Rob Hough, Membership Secretary (317) 517-0427.

BULK LOTS ARE AVAILABLE TO DEMONSTRATORS, SHOPS, SHOWS AND OTHERS WILLING TO MAKE THEM AVAILABLE. WE APPRECIATE YOUR HELP.

The Indiana Blacksmithing Association, Inc., its staff, officers, directors, members, and hosts and the *Forge Fire*, specifically disclaim any responsibility or liability for damages or injuries as a result of any construction, design, use, manufacture or other activity undertaken as a result of the use, or application of, information contained in any articles in the *Forge Fire*. The Indiana Blacksmithing Association, Inc. And the *Forge Fire* assumes no responsibility or liability for the accuracy, fitness, proper design, safety, or safe use of any information contained in the *Forge Fire*.

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More nearby resources and organizations for blacksmiths:
Rural Smiths of Mid-America:
Meetings are on the first Saturday of each month
Call Ron Gill
317-374-8323 for details

IBA MEETING SCHEDULE	
Check the latest <i>Forge Fire</i> for monthly IBA revisions.	
Sept 16 2023	NO MEETING
Sept 22- 24	SOFA QUAD STATE SEPT 22-24
Oct 6-7 2023	IBA SOUTHERN CONFERENCE AT BUNKUM VALLEY
Nov 18 2023	TBD



INDEX

PGS 3-4
SATELLITE NEWS

PGS 5-8
DAMASCUS RING

PGS 9-11
SPIRAL AND
CURVED HAND-
RAILS EXPLAINED

Editors Message

IBA Fall Conference

Jim Malone and Bunkum Valley Metalsmiths will be hosting another Fall Conference with the IBA on Friday October 6th and Saturday October 7th. There is plenty of room for those interested in primitive camping and arrival and departure is flexible between Thursday evening and Sunday afternoon. Food on Friday evening is pitch in and Saturday it will be free will donation for breakfast and lunch. On Saturday we could use donations of chips or dessert items but not required. This will be at the home of Jim and Kathy Malone, 14586 N 1100 E, Odon, IN 47562 phone 812-636-7533

FALL CONFERENCE AGENDA

Friday October 6th

5pm Sandcasting demonstration by Randall Kinnaman
***Dinner will be a pitch in

Saturday October 7th

7:30am Breakfast available

9:00am Josh Sampson will be demonstrating

12:00pm Lunch available

1:00pm John Bennett will be demonstrating favorites

Please note there will an iron in the hat event hosted by the IBA

There will be more sandcasting with Randall in the afternoon.

5:00pm Closing

New IBA Satellite Group

Nathanael Brandt and Coal Iron in Anderson will be the host site for IBA's newest satellite group. They plan to meet the last Saturday of each month starting October 28. More details to follow.

Farrel Wells passed away

Farrel passed away on August 28th, 2023. Farrel was a long time member of the IBA. He served on the board of directors and he worked as the treasurer and membership chair for over 15 years. Aside from his service to the IBA, Farrel was an all around wonderful person. He was quick witted with a great sense of humor.

He will be missed.



Dates to Remember

September 22-24
SOFA Quad State

October 6-7
IBA Fall Conference hosted by
Jim and Kathy
Malone

IBA website: www.indianablacksmithing.org **IBA Facebook page:**
www.facebook.com/groups/IndianaBlacksmithingAssociation/

IBA Satellite Groups and News

1) Sutton-Terock Memorial Blacksmith Shop

Meet: 2nd Saturday at 9 AM
 Contacts: Fred Oden (574) 223-3508
 Tim Pearson (574) 298-8595

2) Jennings County Historical Society Blacksmith Shop

Meet: 2nd Saturday at 9 AM
 Contact: Paul Bray (812) 521-7177

3) Wabash Valley Blacksmith Shop

Meet: 3rd Saturday at 9 AM
 Contacts: Bill Cochran (812) 241-8447
 Max Hoopengartner (812) 249-8303

4) Fall Creek Blacksmith Shop

Meet: 4th Saturday at 9 AM
 Contacts: Gary Phillips (260) 251-4670

5) Maumee Valley Blacksmiths

Meet: 2nd Saturday
 Contacts: Clint Casey (260) 627-6270
 Mark Thomas (260) 758 2332

6) St. Joe Valley Forgers

Meet: 4th Saturday at 9 AM
 Contacts: Bill Conyers (574) 277-8729
 John Latowski (574) 344-1730

7) Rocky Forge Blacksmith Guild

Meet: 2nd Saturday at 9 AM
 Contacts: Ted Stout (765) 572-2467

8) Meteorite Mashers

Contacts: Mike Mills (812) 633-4273
 Steve King (812) 797-0059
 Jeff Reinhardt 812-949-7163

9) Whitewater Valley Blacksmiths

Meet: 2nd Saturday
 Contact: Keith Hicks (765) 914-6584

10) Bunkum Valley Metalsmiths

Meet: 1st Saturday
 Contacts: Jim Malone (812) 725-3311
 Terry Byers (812) 275-7150
 Carol Baker (317) 809-0314

11) Covered Bridge Blacksmith Guild

Meet: 1st Saturday
 Contact: John Bennett (812) 877-7274

12) Snake Road Forge

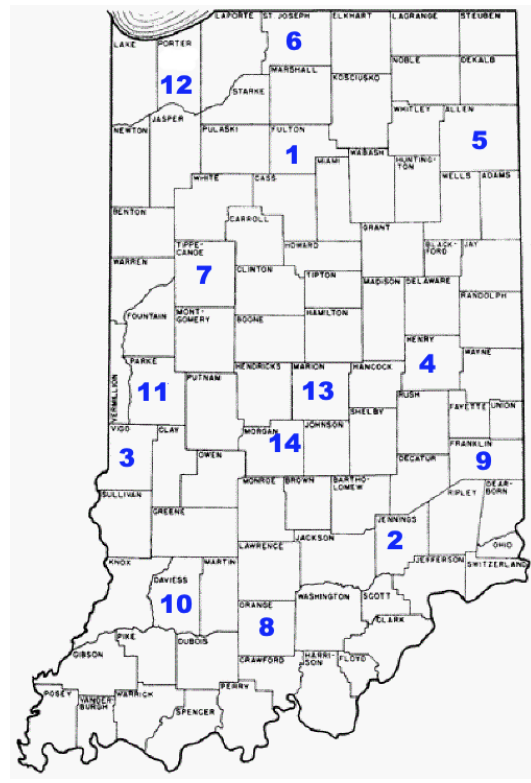
Meet: 1st Saturday
 Contact: Rod Marvel (219) 241-0628

13) Satellite 13

Meet: 4th Saturday
 Contact: Darrin Burch (317) 607-3170
 Doug Wilson (317) 439-7684

14) Old Town Waverly Blacksmiths

Meet: 2nd Saturday
 Contacts: Mike Lyvers (317-728-5771),
 Kenny Hale (765-318-3390),
 Mike Jackson (317-509-9115).



Meteorite Mashers

July's meeting was held at Steve King's very nice shop in Paoli. Well attended for a hot day in the summer. Jason Hardin an old member was present, good to see him after a long absence, Had beginner blacksmith, Sam visit and boy is that young man hooked! He made a very nice drive hook, and cleaned up at Iron in the hat, as many members gave him their winning tickets so he could start a tool collection as part of his path in blacksmithing.

Next meeting will be at Jason Bowman's shop in Elizabeth.

IBA Satellite Groups and News (continued)

Jennings County Historical Society Blacksmith Shop

July News

The Vernon Blacksmiths met on the 8th with Jim Bynam heating pieces of tubing and bending them until he had four, suitable for legs to a cast iron forge. Kevin Welsh showed us how to master the art of tong making. He then mentored Chad Springer, a newcomer, in making a fancy "S" hook from 1/4" round stock. We all sat and watched while Kevin amazed us as how easily he seemed to texture this beautiful butterfly. Thanks to all that have worked so hard on our hammer. Next meeting at Vernon on the 12th. Dig out some iron in the hat, we seemed to be a little short. And, yes I'll bring my wallet too, thanks. Paul Bray

August News

Kevin Welsh repaired some items Ed Puttoff made that was damaged by a tree limb. Dave Good worked on making a handle for a chip hammer. Doug Watson worked on a pair of tongs (to be finished later). Bill Kendrick was instrumental in anchoring our newly acquired power hammer. we had 19 people to sign in. hope to see everyone on the 9th of September. Anyone wishing to attend Gerald Williams memorial at 1:00 will still have time to make it. hope you can find some good iron in the hat items. Paul Bray

For Sale:

Frankenhammer – works well, see picture. If interested, please contact Dave McNulty for further details. I can help load after disassembled.

\$1000 OBO

Cell:
812-592-0102



Bunkum Valley Metalsmiths

Everyone is invited to attend the White River Valley Antique show beginning this Thursday through Sunday at the fairgrounds in Elnora. This is a great family event with something for everyone. There are several flea market areas, vintage cars, a grist mill, sorghum making, Church and school reenactments, working blacksmith shop and much more. Please check out <https://wrvaa.org>. Admission is only \$5 each and food is available. Come and see us at the smithy!

We are pleased to be hosting another Fall Conference with the IBA Friday October 6 h and Saturday October 7th . There is plenty of room for those interested in primitive camping and arrival and departure is flexible between Thursday evening and Sunday afternoon. Food on Friday evening is pitch in and Saturday it will be free will donation for breakfast and lunch. On Saturday we could use donations of chips or dessert items but not required. This will be at the home of Jim and Kathy Malone, 14586 N 1100 E, Odon, IN 47562 phone 812-636-7533

Damascus Ring

Will Stimson, Bishop
Mike Mumford, Ridgecrest

Will has been one of my blacksmithing students, recently completing his Level 1 (yay!). A recent move caused him to close down his shop, he asked to come down to my shop to make a Damascus ring.

This was a commission for a friend's future engagement.

The deal for using my shop was that we would put the episode together as a story for the magazine.

Here's the story.

Will showed up on a Sunday morning, starting just after early church - praying that all this would go well.

He brought materials to start with a 12-layer billet, 1095 & 15n20. Approximately 1.5" x 1" x 2".

His goal was a ring about 1/4" thick, 3/4" ID, with 1/8" walls.



We started by laying it out on the anvil.



After cleaning with acetone, we welded the edges with the MIG, then welded on a 1/4" x 3/4" porter bar.

Will carefully noted that the narrow side of the porter bar corresponded to the layers.



We brought the (propane) forge up to welding heat, then the first job was to set the weld. Fluxed, then forge welded.

This 4 page article is reprinted from September/October 2023 edition of the California Blacksmith Online. The online newsletter of the California Blacksmith Association.

Damascus Ring



Will then alternated between drawing dies in the hydraulic press and the hand hammer, to draw the billet out to 5/8" x 5/8".

Next, he let it cool a bit, then grind clean, cut & fold. Clean the mating surfaces again, then flux and reweld. Now he had 24 layers.

He went through the drawout process, then cleaned, folded, and welded again.

Now he was at the desired 48 layers. in a billet 5/8" x 5/8" by about 8".



Look carefully, you can see the layers.

So - set that aside for a bit.

Test Piece

We decided that he should do a test run with a piece of 1/2" sq mild steel, to make sure we had the process down.

He forged the 1/2" x 1/2" down to 3/8" x ~ 5/8".

Then, marked at 3/16" from the end.



Next, punched a 5/8" long slot



Then he drifted over both a bolster plate and on the anvil horn.



Damascus Ring

As he got near to the desired diameter, he used the hand hammer with the ring on the anvil horn to get rid of the cat ears.

(The photo also shows using a small vise mounted horn)



In one test, there was a bit of a divot on the stem end - the solution was to hammer on the end of the stem, driving the steel down to fill the divot.

The section opposite the stem came out a bit too small. So we tried again with a second test piece, punching at 5/16" from the end. This time he got the end-dimension he wanted.



Back to the damascus billet

Will split the billet into two halves, one to be left as "flat" layers, the other to be twisted so that we could decide later which we liked better.



As with the test pieces Will drew the sections down to 3/8" thick, then punched & drifted.

The desired ring size was 10.5, corresponding to a 0.79" ID. Will forged the rings to 0.75", to be ground out later.



After cooling, here are the two ring sections, ready for the next steps. The flat-layered piece is on the left, the twisted piece is on the right.



This was a full day's work. Will then took the sections back home for cleaning, grinding, polishing, etching, and finishing.

Damascus Ring

Finishing

A Dremel got the ID sized and to knock off the inside edges. The belt grinder roughed out the OD.



A forstner bit was used on a drill press to make a perpendicular hole for the roughed ring to seat itself in, then a right angle guard to guide the ring against the grinder to make each side of the ring parallel and to get the width of the ring where it needed to be.



The "final" ring thickness was then ground manually by rolling on a surface to see which sides had more mass to grind down. Layout fluid and calipers could have been used also.

The banding on the ring could then be smoothed out with a coarse grit and then when the geometry was satisfactory, the slack part of the belt was used to smooth out any irregularities. Went up to around 400 grit.



With a buffing wheel on the Dremel, he polished the inside and outside with E5 and SCR compounds.

Then he cleaned the ring with rubbing alcohol, used ferric chloride and distilled water at 50/50, then let the ring soak 15 minutes at a time until satisfied with the depth of the etch. Baking soda was used to neutralize the acid and the ring was rinsed in cool water.



Will didn't have the green polishing compound up until this point, so he polished the ring once more at this step with just the green compound. Last step was to seal the ring with protectaclear. It's not permanent but by the time it wears off we're hoping oils from the skin will prevent oxidation.

This 3 page article originally appeared in The New England Blacksmith Newsletter, Winter 2023

JUDSON YAGGY

*Spiral and Curved
Handrails Explained*



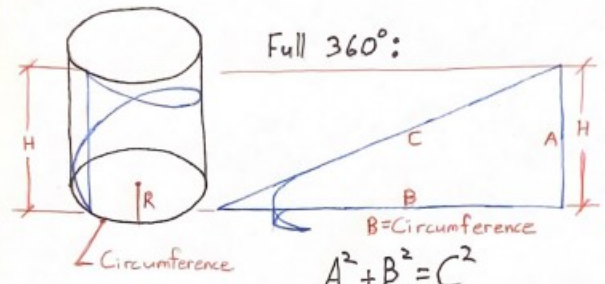
"There is not a lot of information on how to do this in the blacksmithing literature, and one of the widely published solutions, I believe, is incorrect."

If your blacksmithing journey takes you down the road of architectural ironwork, eventually someone is going to ask you to make a curved handrail or even a full set of spiral stairs. In a perfect world, this request would come with well detailed shop drawings from the architect, the budget, time and space to build a full size mock-up of the stairs in your shop, an in-house drafts-person to generate 3D renderings, and a fully finished set of stairs on the job site to test fit your work on. In reality however, you would be lucky to have one or two out of those four. Drawings are often incomplete or inaccurate, shops are usually too small, and stair finishes (finished treads, risers, and other trim) tend to be installed very late in a project to protect them from damage by worker traffic.

The intent of this article is to give you some tricks to overcome some of these issues. There is not a lot of information on how to do this in the blacksmithing literature, and one of the widely published solutions, I believe, is incorrect. The following sketches and formulas I have found on the internet, deeply buried in mathematics chat rooms and in one case a bricklayer's handbook from the 1890's. Disclaimer: before you decide to base a paying job on what someone told you they found on the internet, do your own tests and verify that this works for you! Please understand that I'm not a mathematician. I've attempted to distill the formulas into something that makes sense on a high school algebra level. I don't know why they work, but I've had success using them. They allow the blacksmith to save time and money by bending handrails to a simple curve generated by cranking some on-site measurements through some formulas.

Picture a regular (not curved) set of stairs as a triangle with the overall rise and run forming two legs of the triangle, and the nosing line as the hypotenuse. A nosing is the leading edge of a finished stair tread. Draw a line connecting all of them. The length of that nosing line is also the length of your handrail not including scrolls or other end details. A helical or spiral stair is that same triangle except that it's been wrapped around a cylinder. The run of the stairs is equal to the cylinder's circumference if it's a fully circular stair, and it's equal to its arc length if the stairs don't rotate fully

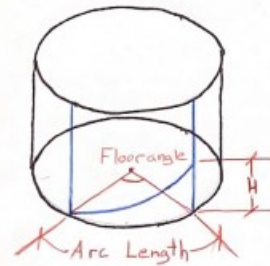
Handrail or Helix Lengths



$$A^2 + B^2 = C^2$$

or

$$C = \sqrt{\text{Height}^2 + \text{Circumf.}^2}$$



Less than 360°:

$$\text{Helix Length} = \sqrt{\text{Height}^2 + \text{Plan view arc length}^2}$$

The drawings I have provided are visual aids in understanding a helical rail, and the length formulas are variations on the pythagorean theorem. This gives you some of the variables to plug into the radius of curvature formulas. Radius of curvature (RoC) for a blacksmith

Radius of Curvature (RoC) Formula

$$\text{RoC} = \frac{\text{Total Rise}^2 \times 32.82.8}{\text{Floor Angle}^2 \times \text{Floor Radius}} + \text{Floor Radius}$$

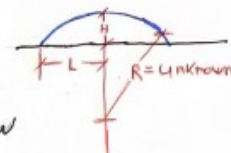
↳ 360° if full rotation

$$\text{RoC} = \frac{4\pi^2 R}{H^2 + (2\pi R)^2}$$

$$\text{RoC} = \frac{\text{Helix Length}^2 (\text{R of Cylinder})}{\text{Arc Length}^2}$$

↳ πD if 360°

Finding an Unknown Radius in Plan View

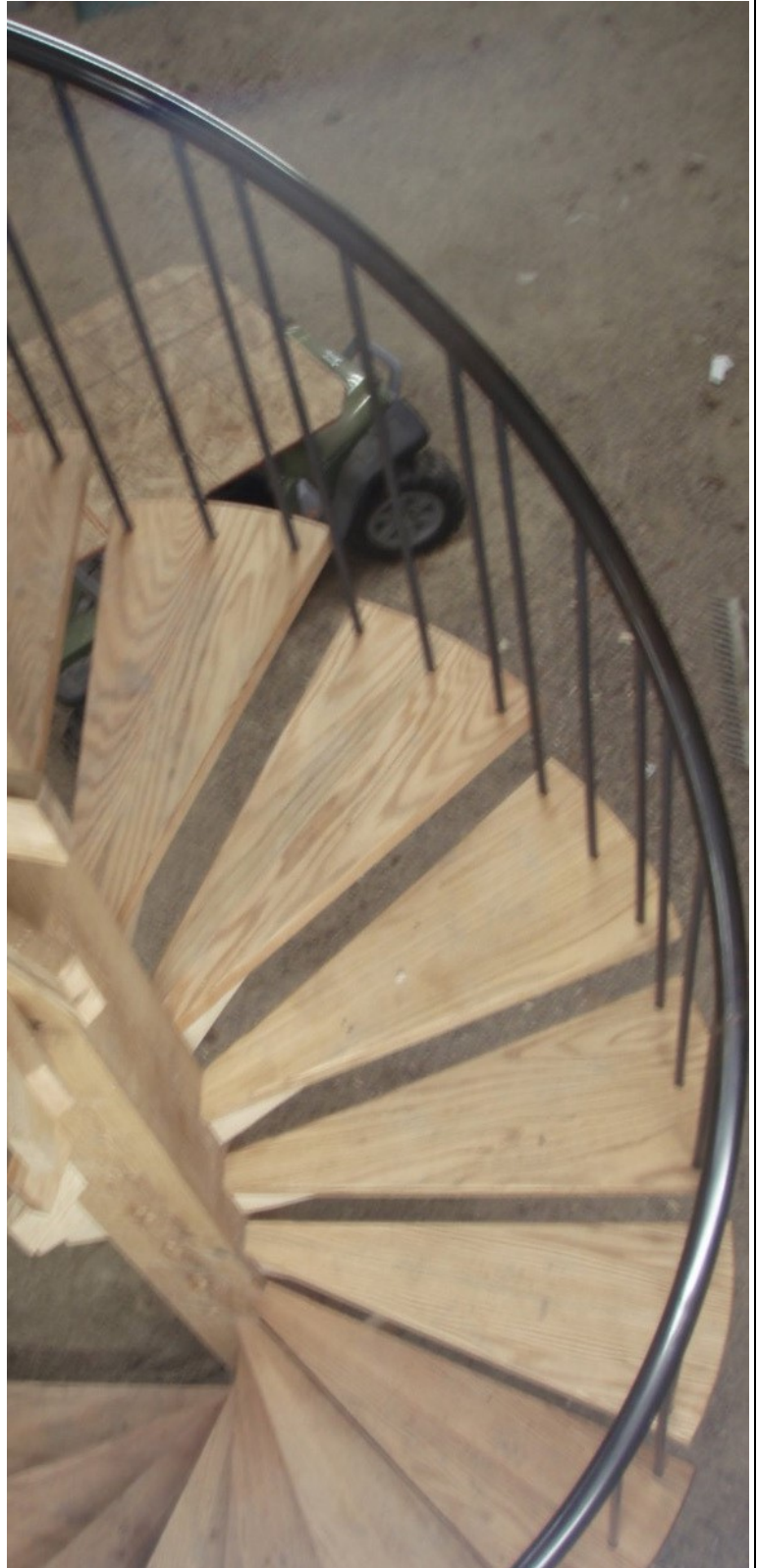


$$R = \frac{L^2 + H^2}{2H}$$

is a curve you bend or roll into a work piece in two dimensions (flat) so that when you tip it up to the stair angle the handrail follows the outside of the cylinder as it rises. This will form your handrail. The RoC will always be bigger than the radius of the cylinder formed by the stairs. I've included three RoC formulas because even though they are similar and should all arrive at the same curve, they have slightly different inputs.

To fill in a formula, go measure the stairs or pull numbers off a blueprint. The information you can gather from a site visit and architectural drawings may vary due to site conditions, construction style of the stairs, and progression of the construction project. The last formula can be helpful on a large radius stair which only completes a partial turn where the radius is unknown or you don't trust that reality matches the drawings. When making your site visit, be sure to have laser levels, angle finders, string line, framing squares, and both standard and flexible tape measures in your kit. Gather as many accurate dimensions as you can. If at all possible talk to the actual carpenter or woodworker who built the stairs, not just the architect or project manager. Carpenters will often have wooden templates they used as construction aids saved somewhere on a job that they will give to you if asked. Take that same opportunity to inquire about blocking in the wall for attaching your handrail. Higher quality builders often take photos of every wall in a house before sheetrock or other finishes get installed so ask if they have photos of what's in the wall. Don't forget that often finished flooring is a different thickness than finished stair treads so investigate finish thickness if you see only subfloor or temporary stair treads. This is why first and last rises on rough stairs are often different from the rest of the rises and could throw off your overall height measurement.

Finally a note on rectangular cross section grab rails. If you are constructing a profiled or rectangular rail you will need to introduce some twist into the RoC. Simply bending the RoC and placing the rail on the stairs will result in the top and bottom of the rail being out of level. Technically this is true for a round rail as well, but you can't tell because it's, well, round. I have not found a way of calculating how much twist to introduce other than trial and error. If anyone has a tip for that please reach out. I hope you find these explanations clear and the formulas useful. Happy hammering!





The **FORGE FIRE**

Newsletter of the
Indiana Blacksmithing Association, Inc.

Rob Hough

Membership Secretary
9790 N Sharp Bend Rd
Albany, IN 47320

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1100 E, Odon, IN 47562 phone 812-636-7533

Friday October 6th

5pm Randall Kinnaman sandcasting demo

***Dinner will be a pitch in

Saturday October 7th

7:30am Breakfast available

9:00am Josh Sampson demonstration

12:00pm Lunch

1:00pm John Bennett demonstration

Iron in the hat event hosted by the IBA

More sandcasting with Randall

5:00pm Closing



SOUTHERN OHIO
FORGE & ANVIL

Quadsate 2023
Sept 22, 23, & 24
Miami County
Fairgrounds
Troy, OH

Visit www.sofablacksmiths.org for
downloadable registration forms and
QuadState 2023 updates.

Friday

- 12:00 PM - 6:00 PM Tailgate Sales
- 6:00 PM - Friday Evening - Opening Ceremonies
Short Introduction of Demonstrators
- 6:30 PM - Forging Demonstration - by Mark Aspery

Saturday

- 9:00 AM - 12:00 Demonstrations
(Hands-on Beginners Instruction in U-Forge Area
10:00AM to 12:00 and 1:30PM to 3:30 PM
Sunday 9:00AM to 12:00)

- 1:00 PM - 4:00 PM Demonstrations

- 5:30 PM Saturday - Auction

- 7:30 PM Saturday - Forging Competition

Sunday

- 8:45 AM - Presentation of Awards and Prizes

Demonstrator List: Mark Aspery - Traditional
Springville, CA. Lin Rhea - Bladesmithing, *Prattsville, AR*
Richard Sullivan - Gunsmith, *Williamsburg, VA*
Allan Kress - Tooling, *Cullman, AL*
Clayton Spencer - Tooling, *Union Hill, AL*
Cincinnati Hands on Instruction