

# Metal casting

Unlimited Possibilities  
An Art... A Science... A Career



# Metal casting

Unlimited Possibilities

An Art... A Science... A Career

By: Russ Rosmait, Professor  
Pittsburg State University  
Pittsburg, Kansas

BS – Industrial Educational, UW–Stout 1981

MS – Vocational Education, UW–Stout 1985

Ed.D – Oklahoma State University, 1996

## About US (FEF)

Foundry Educational Foundation (FEF) was established 75 years ago with the primary objective to bring top-quality men and women into the casting industry.

FEF has since become the key advocate for bringing top-level talent enter the casting industry

Mini Foundry Experience aims to help offer metal casting technology to schools.

Mini Foundry experiences. Students and Teachers Get:

1. Application of STEM subjects are more easily applied.
2. Makes exciting hands-on experiences..
3. A school in the vicinity of a foundry can get supported by them.
4. Is an inexpensive method of marketing your program.



## Starting a “Mini Foundry” within your technology program

- Why Teach Metal Casting in Wisconsin?
  - Within top 5 of casting production states.
  - 54,297 jobs in Wisconsin are casting related.
  - \$11,149,275,000 in total output.
  - \$3,604,505,600 in total wages
  - \$1,298,692,300 in total Taxes

[www.afsinc.org](http://www.afsinc.org)

## Where do I start?

- Having your own foundry in your school sounds like high costs and a lot of effort. ....  
It doesn't have to be.
- We have created a list of the most important elements to the process
- Also, practical example and ideas for you.

- **Metal Casting Process (Sand Molding) Steps**
  - Step 1 – Product idea / sketch / CAD Drawing
  - Step 2 – Building (3D printing) of Pattern for casting process.
  - Step 3 – Gating & Feeding design
  - Step 4 – Make the Mold (Flask / Molding / Ramming)
  - Step 5 – Pattern removal and mold assembly
    - Allowances – Draft, Shrinkage & Machine finish
  - Step 6 – Melting and Pouring
  - Step 7 – Clean & Finishing
  - Step 8 – Marketing and product sales



Pittsburg State University  
Pittsburg, Kansas

# Standard Shop Flasks





Pittsburg State University  
Pittsburg, Kansas

# Standard Shop Flasks



- Mini Foundry Concept
  - 3D printed patterns and match-plates
  - 3D Printed flasks (4 X 6)
  - Lathe turned rammers
  - Low Cost Petrobond Sand
  - Low-cost melting furnace

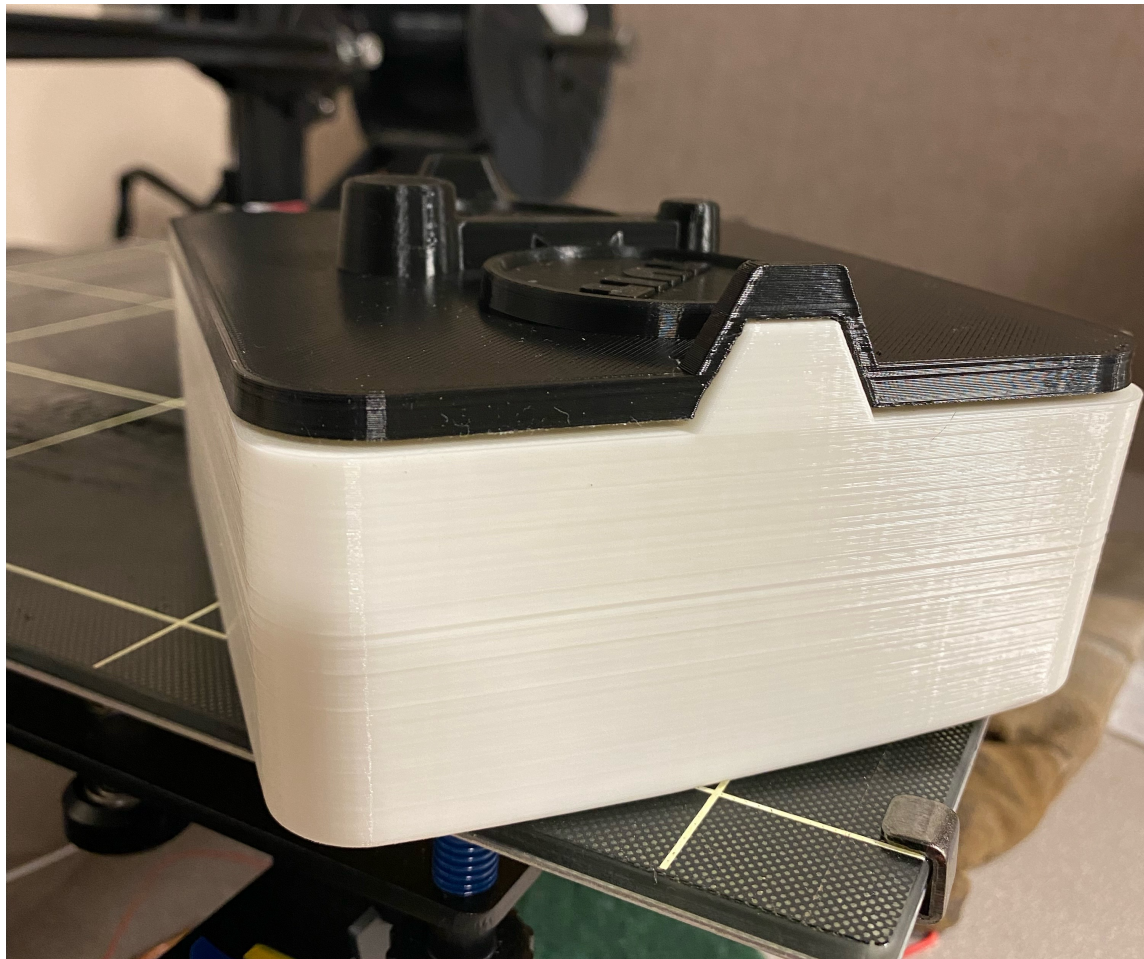
- 3D Printed flasks (4 X 6)



## 3D printed patterns and match-plates



- 3D printed patterns and match-plates



- 3D printed patterns and match-plates



- 3D Printed flasks (4 X 6) Molding



- 3D Printed flasks (4 X 6) Molding





- Finished Flask Casting



- 3D Printed flasks (4 X 6) + Cast Flask



- 3D Printed flasks (4 X 6) + Cast Flask



- Cast Flask ready for molding



- Cast Flask ready for pouring





- Riddle \$25
- Lathe turned rammers
- Sprue Cutter

## Low Cost Petrobond Sand (Cost \$35 to \$90)



- Low Cost Petrobond Sand





# Melting



- Little Melting Furnace
  - Low cost \$330 on Amazon
  - 10 x 11.5 x 12 inches
  - 110 volt
  - 1.3 lbs. or AL



# Pittsburg State University

Pittsburg, Kansas



# Pittsburg State University

Pittsburg, Kansas



# Pittsburg State University

Pittsburg, Kansas



# Pittsburg State University

Pittsburg, Kansas



# Pittsburg State University

Pittsburg, Kansas



# Pittsburg State University

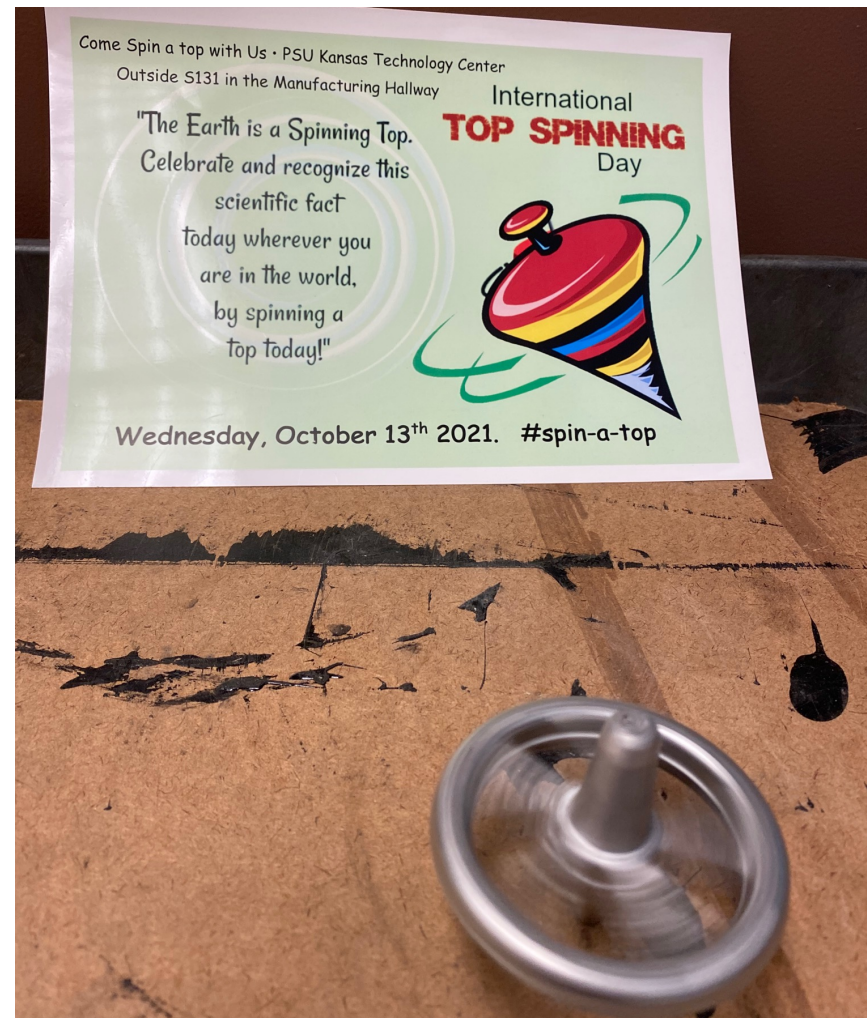
Pittsburg, Kansas





- A foundry at your school gives practical lessons for enthusiastic students
- With Mini Foundry you not only bring a metal Casting to your school, but;
  - 1 – You create a cross the school project activity.
  - 2 – You use new, exciting teaching methods. I.E. Design...3D printing...Casting
  - 3 – You benefit from existing teaching materials.
  - 4 – Here is a fun example project we do for “Casting for Kids”

# Fun Kids Projects



Pittsburg State University  
Pittsburg, Kansas

ACTIVITIES

FUN

HISTORICAL

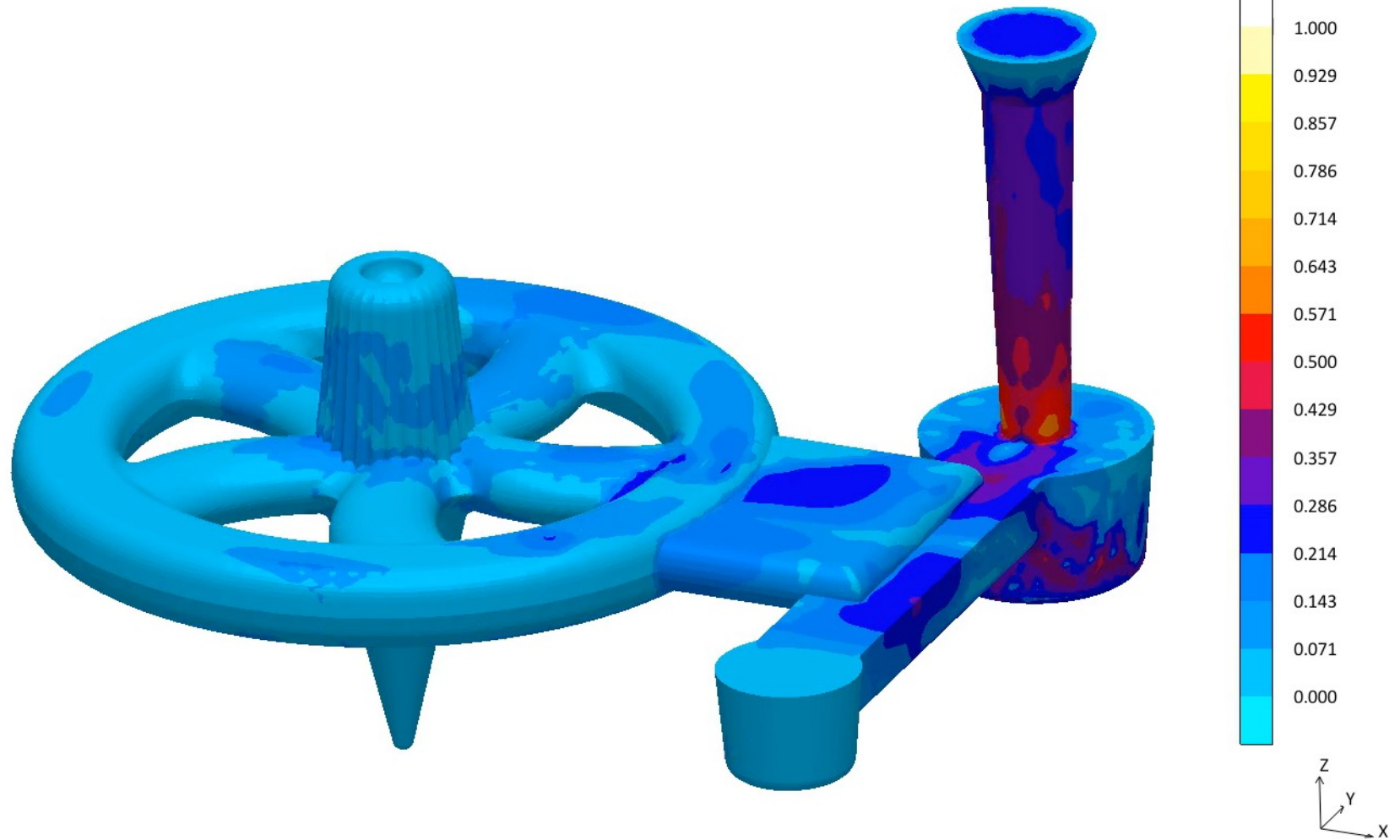
**INTERNATIONAL TOP  
SPINNING DAY –  
OCTOBER 11, 2023**

INTERNATIONAL

## INTERNATIONAL TOP SPINNING DAY DATES

Year	Date	Day
2022	October 12	Wednesday
2023	October 11	Wednesday
2024	October 9	Wednesday
2025	October 8	Wednesday
2026	October 14	Wednesday

# Casting Filling Simulation







# Pittsburg State University

Pittsburg, Kansas





# Pittsburg State University

Pittsburg, Kansas





Pittsburg State University  
Pittsburg, Kansas

Girl Scouts





Pittsburg State University  
Pittsburg, Kansas

Girl Scouts





Pittsburg State University  
Pittsburg, Kansas

# Girl Scouts



Pittsburg State University  
Pittsburg, Kansas

# Girl Scouts





Pittsburg State University  
Pittsburg, Kansas

Thanks For Your Time

**ANY  
QUESTIONS?**

**Contact Email: [rrosmit@pittstate.edu](mailto:rrosmit@pittstate.edu)**