

# ICRI PANEL - CASE STUDIES IN CONVERTING IRON TYPES IN PRODUCTION

Robb Schmidt

American Axle & Manufacturing  
Casting Division - Saint Cloud



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# Different Grades DI in Pressure Pour

- SOME GRADES require more alloy
  - ❑ Add more.
- SOME GRADES require less alloy
  - Put less in.
- THANK YOU!



# Brief Overview of Saint Cloud

- 99% Ductile Iron Facility with two active pouring lines:
  - Disa 270B or a Disa 2070B each with their own 20 ton channel pressure pour, but currently share one sand system.
  - One 32x56, 16/14 BMD connected to a 15 ton channel pressure pour.
- All lines use an automatic Inductotherm VisiPour system.
- One 65 ton channel holding furnace feed those lines via a Fischer Converter Process.

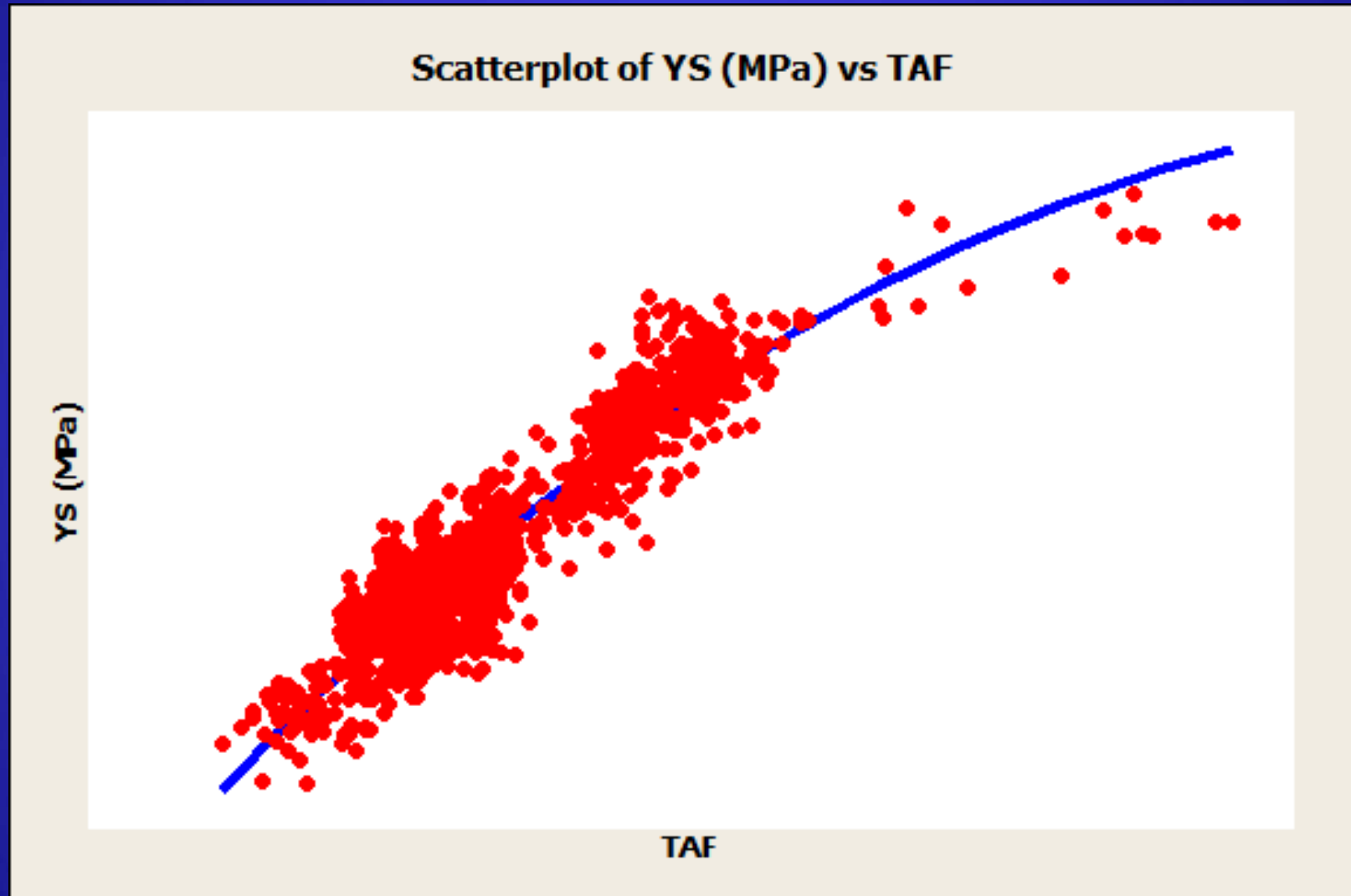


# Control Starts Early

- SAE J434 D450, D500, D550 and D700 as-cast.
- Minimize elements that change.
  - Standardize elements as much as possible.
    - Carbon same throughout all grades.
      - Silicon for CE refinement.
    - Nickel, Moly, other elements held to tight tolerances.
  - Target Total Alloy Factor (TAF).
    - Combined factor of chrome, copper and manganese.
    - We manually vary copper to achieve properties.



# Yield Strength vs TAF



# One Holder

- Everything for DI is in a common holder.
- Holder chemistry is optimized to minimize MnO and FeO slag.
- Holder sample is taken about every hour, so we constantly know where it is at.



# Calculation

- Know the Weight and Chemistry of the Pressure Pour as well as the Converter.
- Simple Stoichiometry:
  - Computer Calculated
  - Two Sets of Eyes
  - Train Everyone in Manual Calculation.

	Weight	Si	Mn	TAF				
PP start	15000	2.61	0.39	1.03				
target		2.55	0.5	2.25				
holder	10000	2.12	0.38	0.95				
Get in	double ?	lbs in Furnace	Si	Mn	TAF	Si Add	Mn Add	Cu Add
PP start		15000	2.61	0.39	1.03			
holder	1	10000	2.12	0.38	0.95			
Adds		218				44	42	132
For Pouring		25218	2.53	0.5	2.25			





# Tap Metal from Holder to Converter

- Process 5 ton batches. Fork trucks have scales installed.
- Add alloys slower going into solution at tap in.
- Add Copper and magnesium just before treatment.





# Tap Metal from Holder to Converter

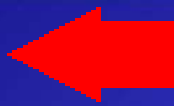
- Take over 5 ton batches. Fork trucks have scales installed.
- Add alloys slower going into solution at tap in.
- Add Copper and magnesium just before treatment.



# After Tap In

- MIX IT!
  - 6 times minimum.
- Chemical Sample to Verify Before We Start Pouring, especially if the jump in TAF is large.





For additional information, please contact:

- Robb Schmidt
- 5200 Foundry Circle, Saint Cloud, MN 56303
- 320-202-3691
- 320-202-3666
- [rschmidt@grede.com](mailto:rschmidt@grede.com)
- [www.AAM.com](http://www.AAM.com)

