



# Wittler Project

# Overview

R&D on Extended Pot-Life Polycarboxylates

Insulated Concrete Form Walls

Concrete Temperature Monitoring

Concrete Match-curing Technology

Jointless Radiant Heat Concrete Floor

Epoxy Floor

Exterior Considerations - cultured stone, precast concrete logs

Solar Energy



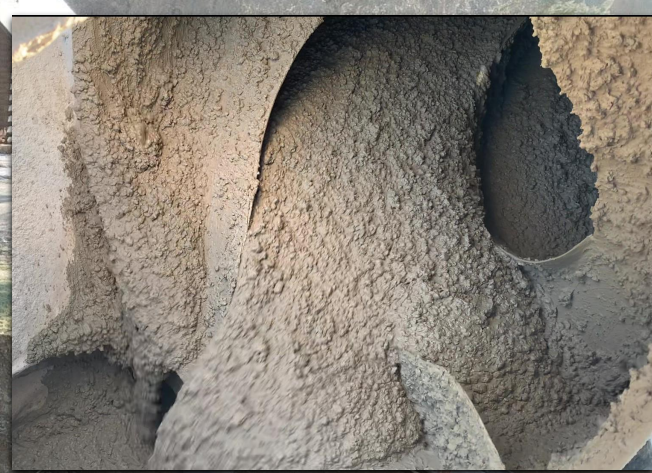
# Footers, a great place to test

## Polycarboxylate Superplasticizer R&D

### Goals:

- Determine pot-life
- Air consistency
- Retempering guidelines

The wall mix was used in footers for the purpose of testing



# Footers continued

## Creating maturity curve benchmark

### Maturity Considerations:

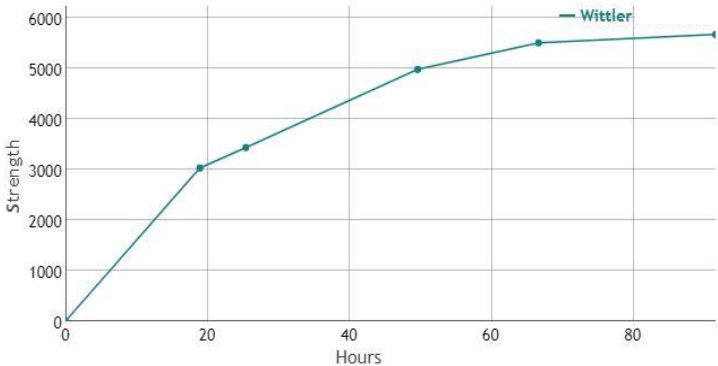
Be conservative

Highest allowable air

Highest allowable w/c

## Edit Maturity Curve Data

☰ MATURITY CURVE DATA



Hours	Strength
0	0
20	3000
25	3400
50	5000
65	5500
90	5800

☰ ENTER MATURITY CURVE DATA

Break Date	Age (Hours)	TTF	Brk 1	Brk 2	Brk 3	Avg
2020-11-30 01:00 PM	DATE CAST					
2020-12-01 08:00 AM	18.96	0.0	3040	3020	0	3030
2020-12-01 02:25 PM	25.44	0.0	3350	3520	0	3435
2020-12-02 02:35 PM	49.68	0.0	4960	5000	0	4980

Maturity Method:

Equivalent Age ▾

Temperature Unit:

Fahrenheit ▾

Maturity Curve Name:

Wittler Barn Floor

Datum Temperature (Td):

32

Specified Temperature (Ts):

73

Q (Act Energy/Gas Const (Deg K)):

4700

Time Unit:

Hours ▾

Strength Unit:

PSI ▾

Date Cast:

2020-11-30 📅

01:00 PM

Concrete Mix Notes:

# ICF Walls

18" o.c. #4 horizontal rebar  
16" o.c. #5 vertical rebar

Backfill Height 10'

Deadman Wall  
6' out 6' high

Needed  
>60' span

80'

12'

4'

10"

48'

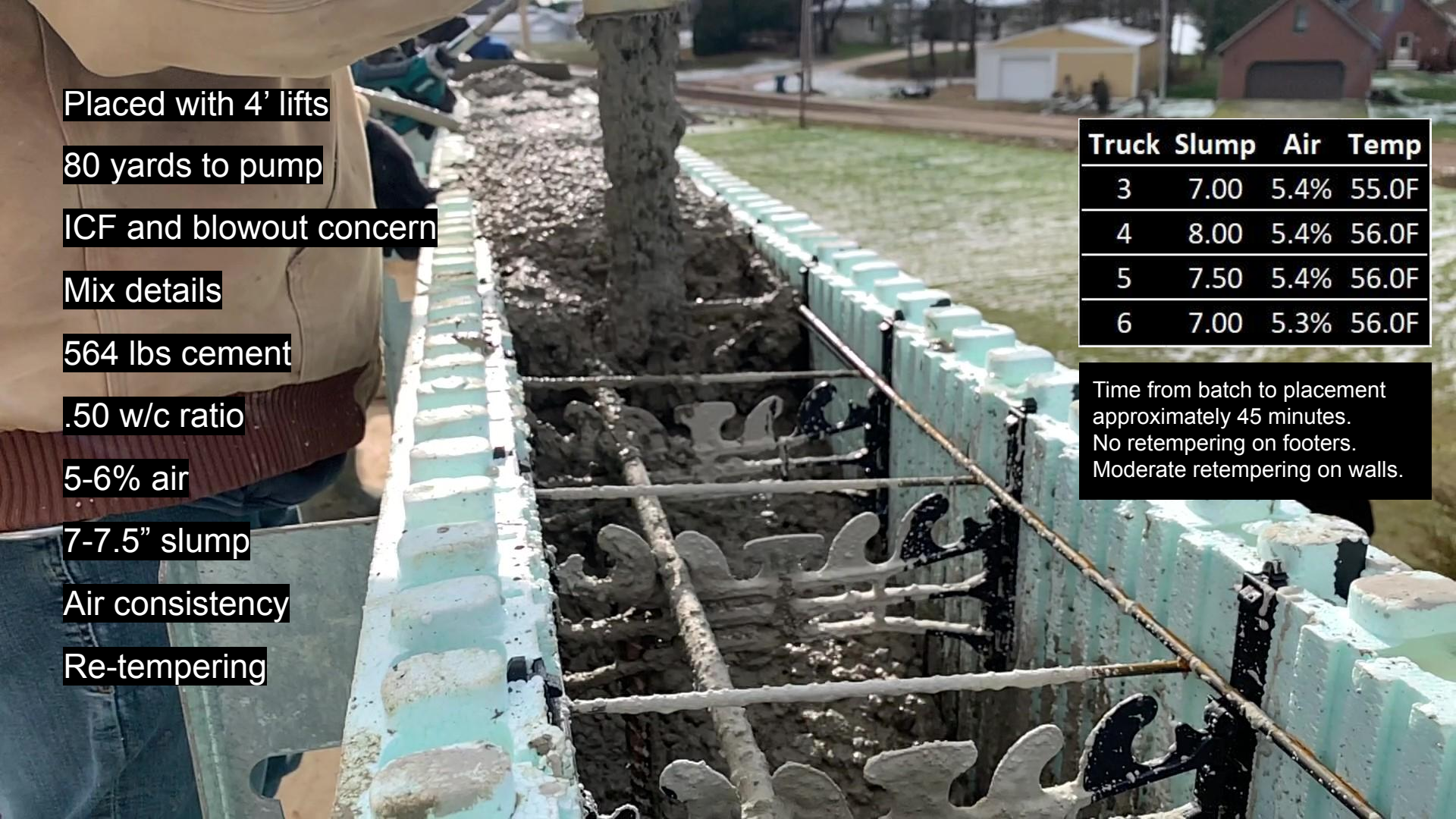
2  $\frac{5}{8}$ " closed-cell insulation (type 2)  
Estimated R-Values:  
Buried 30  
Exposed 40-50

# Wall Sensors Positioning on Rebar



Temperature monitoring

Setting up NEX node



Placed with 4' lifts

80 yards to pump

ICF and blowout concern

Mix details

564 lbs cement

.50 w/c ratio

5-6% air

7-7.5" slump

Air consistency

Re-tempering

Truck	Slump	Air	Temp
3	7.00	5.4%	55.0F
4	8.00	5.4%	56.0F
5	7.50	5.4%	56.0F
6	7.00	5.3%	56.0F

Time from batch to placement  
approximately 45 minutes.  
No retempering on footers.  
Moderate retempering on walls.

Window Sill



# TruMatch

## Match-Curing Technology



# Testing Current Practices

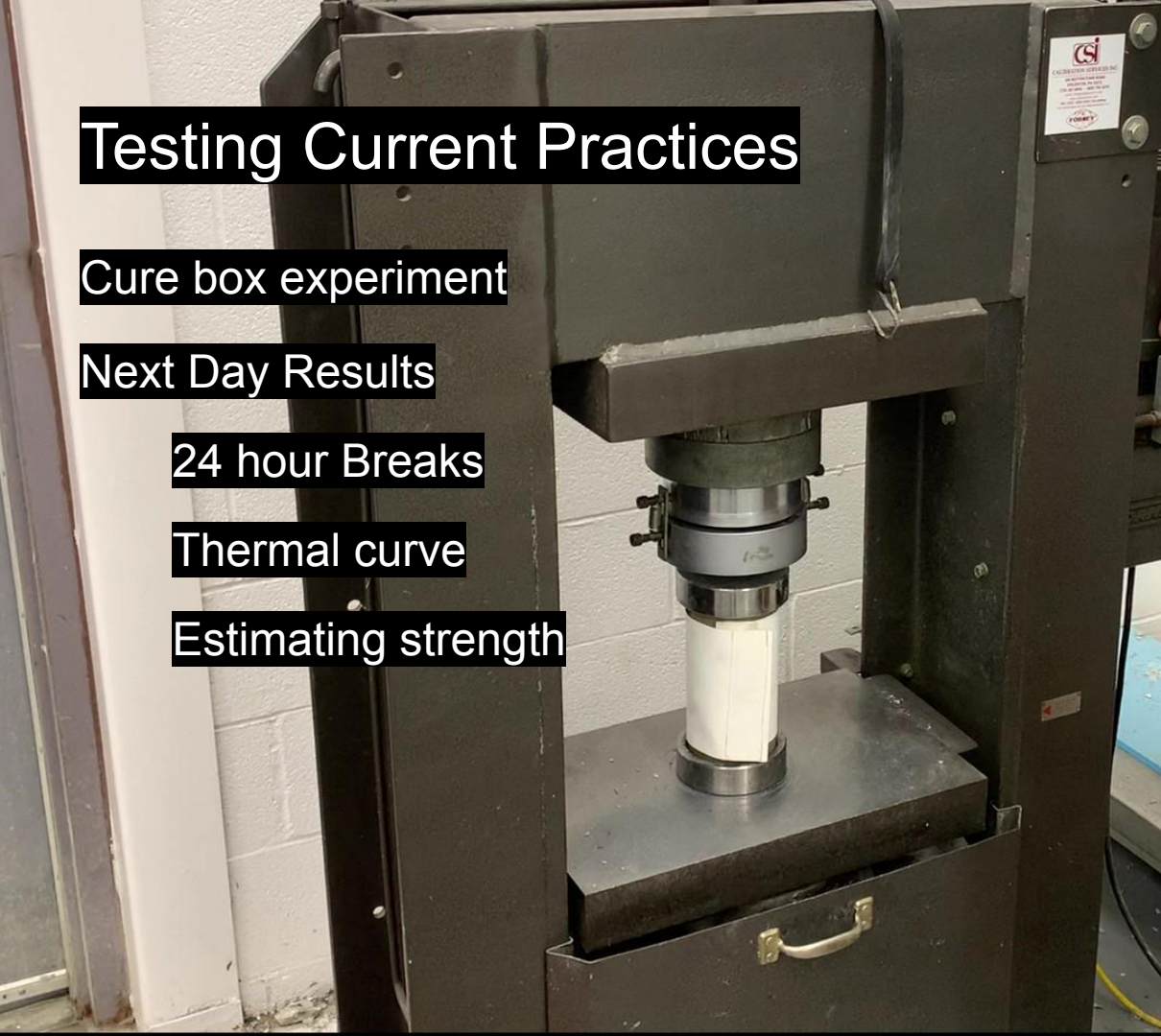
Cure box experiment

Next Day Results

24 hour Breaks

Thermal curve

Estimating strength



PSI

7000

6500

6000

5500

5000

4500

4000

3500

3000

2500

2000

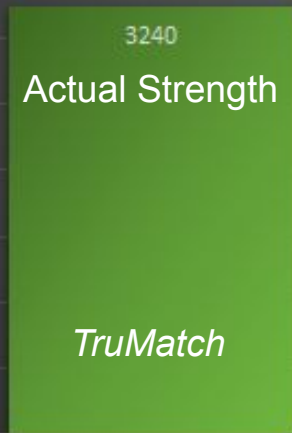
1500

1000

500

0

# 24 Hour Cylinder Break Results



2% difference

3172

*NEX®* Maturity  
Prediction

59% difference

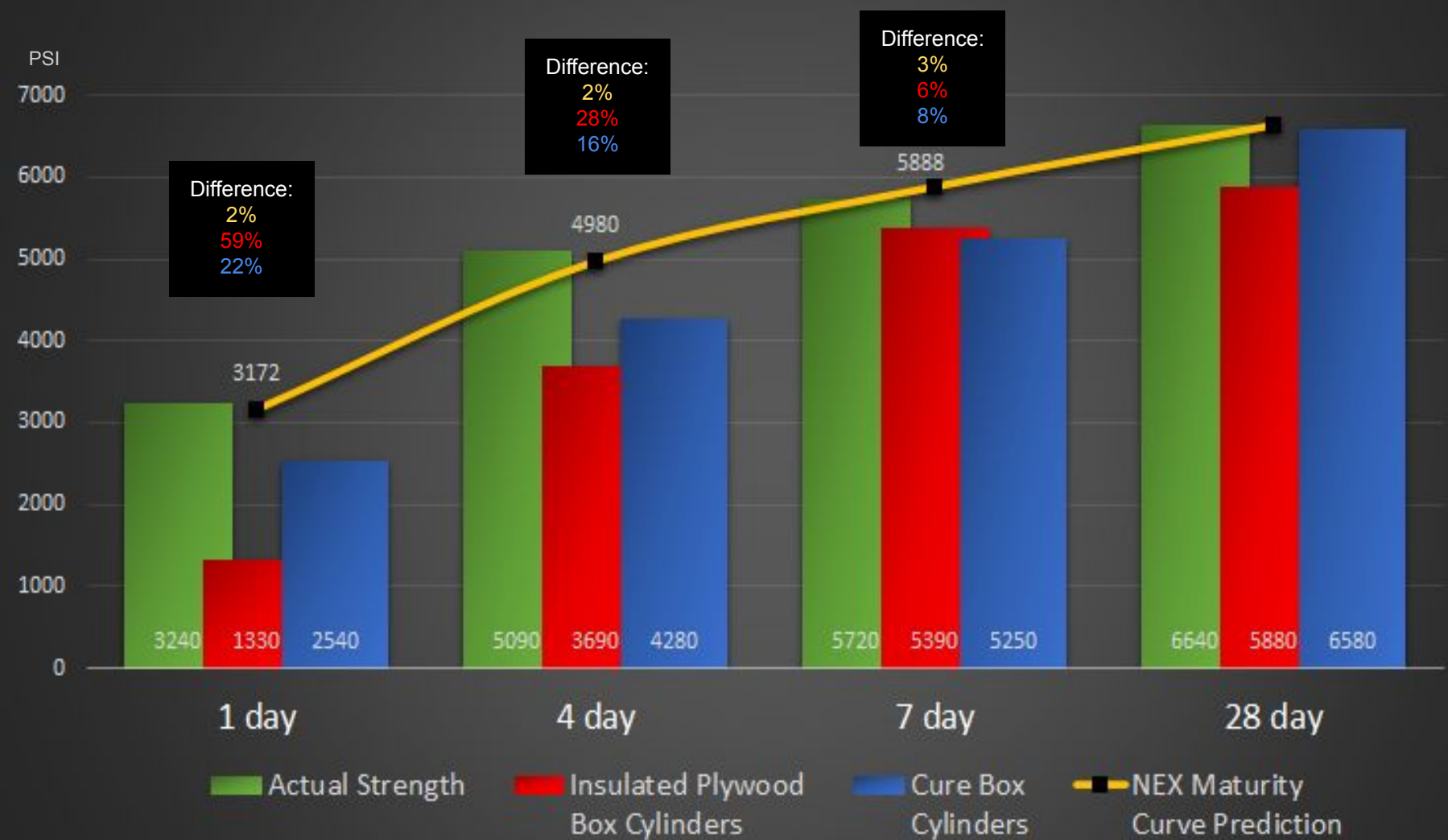
1330

Insulated  
Plywood Box

22% difference

2540

Constant Temp  
CureBox



# Jointless Radiant Heat Floor

48 feet x 80 feet

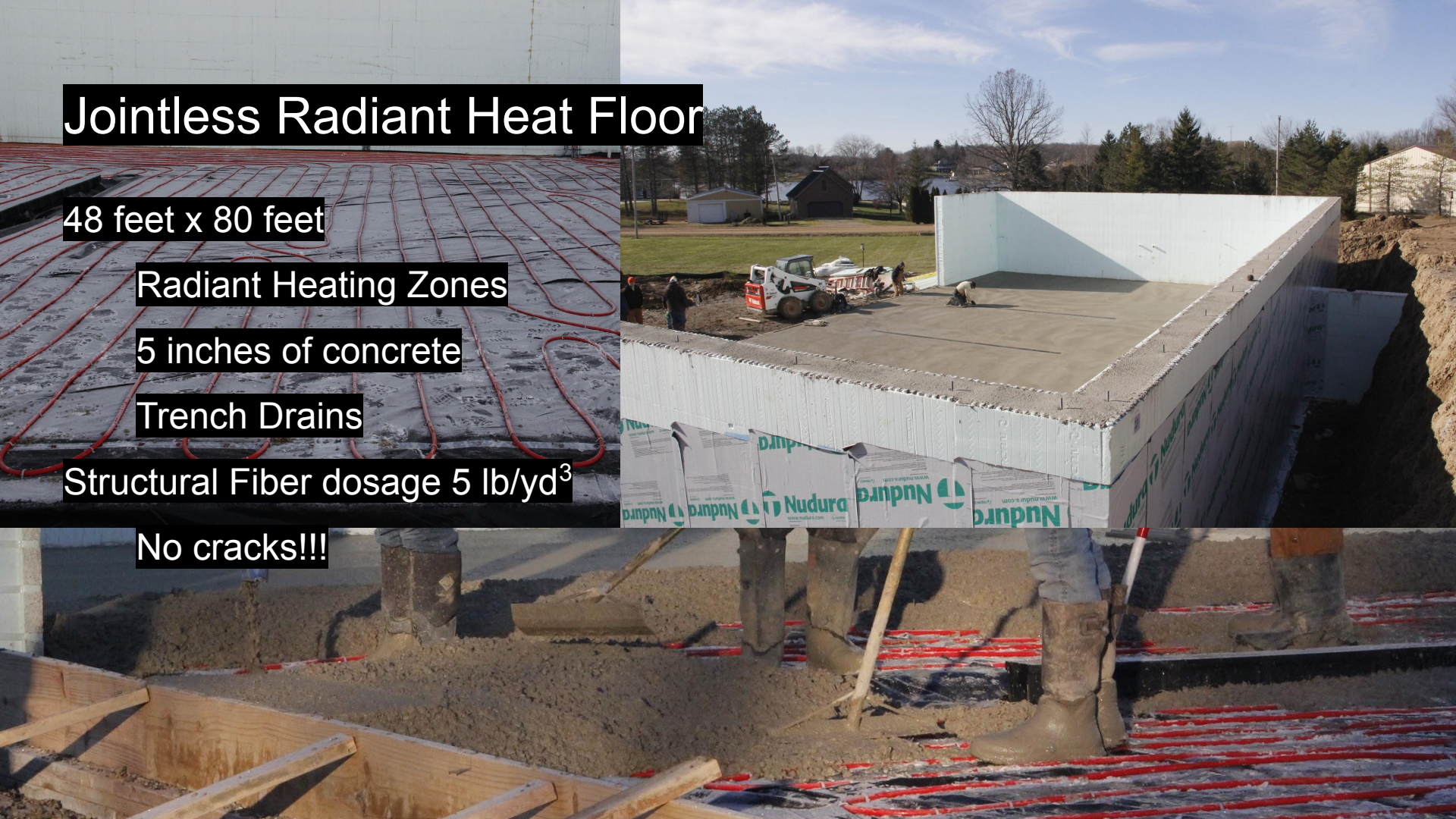
Radiant Heating Zones

5 inches of concrete

Trench Drains

Structural Fiber dosage 5 lb/yd<sup>3</sup>

No cracks!!!



# Trusses



# Pea Stone Backfill



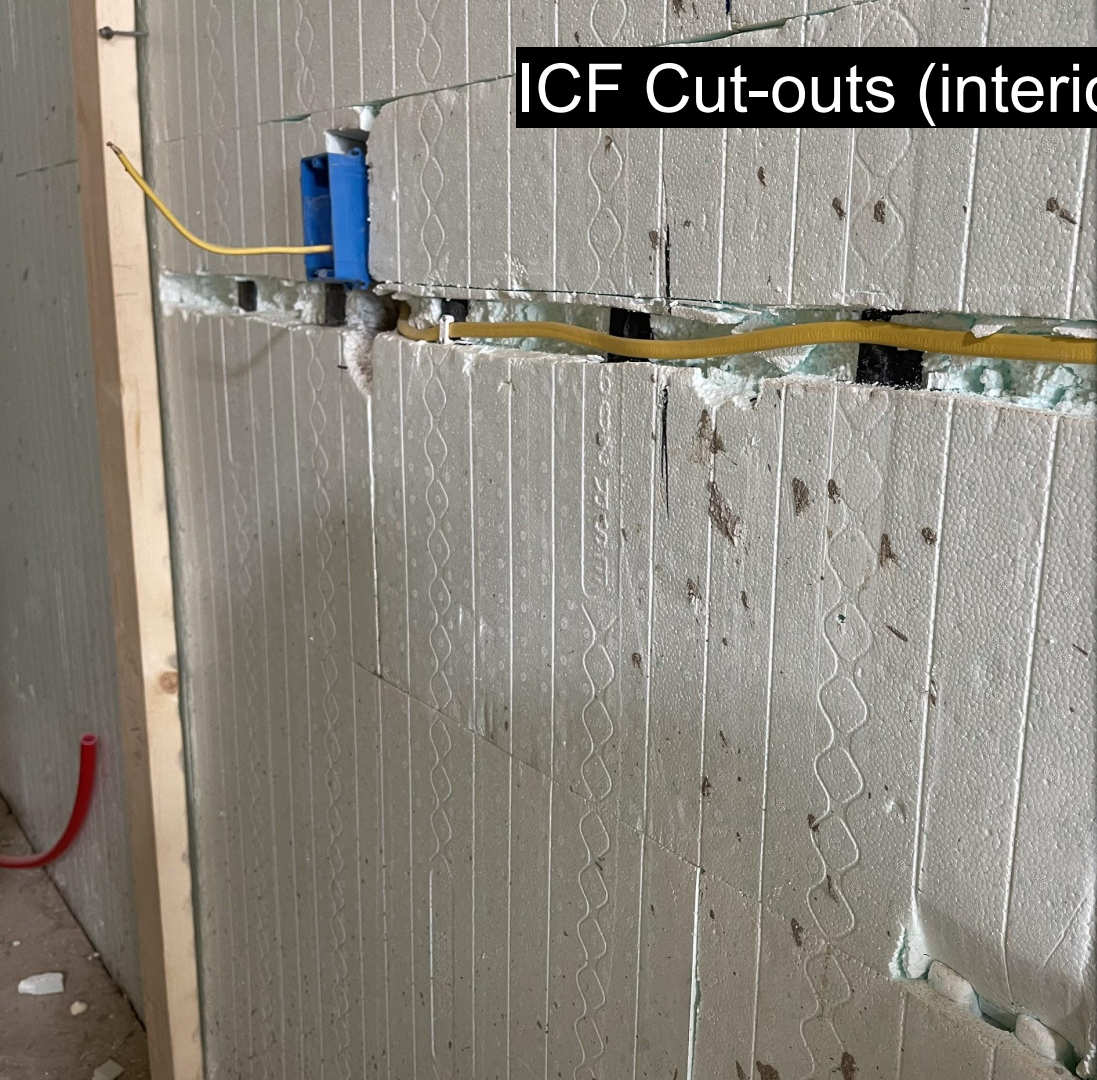
# Radiant Heat



Epoxy Floor



# ICF Cut-outs (interior)





4" closed-cell insulation  
and knee wall

The image shows the interior of a building under construction. The ceiling is vaulted and covered with a thick layer of white, closed-cell insulation. The walls are also insulated, and a knee wall is visible on the right side. The floor is made of plywood and has some construction debris, including wooden planks and a blue container, scattered on it. A window is visible in the background, and a yellow shovel is leaning against the wall near it.









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*Thanks*



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