

## Case Study of Innovation

# FROM HEAT TO STRENGTH

### Modernizing Preheat & Welding for Heavy Fabrication

Traditional nichrome-based heating methods slow down production, consume heavy power, and create inconsistent weld temperatures. For high-thickness pipe joints, this results in longer cycle times and higher rework.

SigmaWeld introduced its Induction Preheating System combined with SWAT Automated Welding, creating a complete end-to-end solution that boosts speed, improves uniformity, and reduces operating costs significantly.



### Challenges with Traditional Heating Methods

Nichrome coil systems rely on indirect heating, leading to heat losses, coil burnout, and poor temperature control. This method demands heavy insulation, produces a hot working environment, and consumes significant power.



### MONTHLY IMPACT (INDUCTION HEATING)

#### Uniform Heating ( $\pm 5^{\circ}\text{C}$ )

Consistent weld-zone temperature for stronger weld strength.

Energy Saved **~93%**

Old: **150 kWh**

New: **9.24 kWh**

Cycle Time: **2.5 hrs  $\rightarrow$  20 mins**

Dramatic reduction in heating duration.

### HIGH POWER CONSUMPTION

**~150 kWh** per cycle

Long Heating Time  
**2.5–3** hours per joint

#### High Maintenance

Regular coil burnouts and insulation replacement

# AFTER: SIGMAWELD SWAT WELDING AUTOMATION

## Automated Precision for Critical Weld Joints

Once induction establishes the correct preheat temperature, SigmaWeld's SWAT Automated Welding System takes over. The synergy of stable preheat + machine-controlled welding ensures consistent, repeatable, and defect-free welds.

- ✓ Stable travel speed
- ✓ Controlled oscillation
- ✓ Lower rework (<2%)
- ✓ Improved bead uniformity
- ✓ Safer operator environment
- ✓ Faster overall cycle time



# THE COMBINED ADVANTAGE

## End-to-End Efficiency

By integrating Induction Preheating + SWAT Automation, fabricators can reduce the overall welding cycle from 4 hours to nearly 1.5 hours, increase output, and maintain consistent weld quality across all joints.

## Induction Heating – Performance Summary

Parameter	Old Nichrome	SigmaWeld Induction	Improvement
<b>Time to Reach 200°C</b>	2.5 hours	20 min	<b>7.5× Faster</b>
<b>Power Draw</b>	60 kW	28 kW	<b>↓ 52%</b>
<b>Energy Used</b>	150 kWh	9.24 kWh	<b>↓ 93%</b>
<b>Temp Uniformity</b>	±25°C	±5°C	<b>5× More Consistent</b>

# ENERGY SAVING CALCULATION

Old Method:

$$60 \text{ kW} \times 2.5 \text{ hr} = 150 \text{ kWh}$$

New Method (Induction):

$$28 \text{ kW} \times 0.33 \text{ hr} = 9.24 \text{ kWh}$$

Energy Saved per Cycle:

$$150 - 9.24 = 140.76 \text{ kWh}$$

## COST SAVING (₹10/kWh)

Old Cost: ₹1,500 per cycle

New Cost: ₹92 per cycle

Saving per Weld: ₹1,408

## 17 ANNUAL SAVINGS SUMMARY

Saving	Amount
Per Weld	₹1,408
Monthly Saving	₹84,480
Yearly Saving	₹10,13,760
Maintenance	₹50,000

**Improve quality, reduce cost, and accelerate your weld cycles  
— all with one integrated solution.**

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