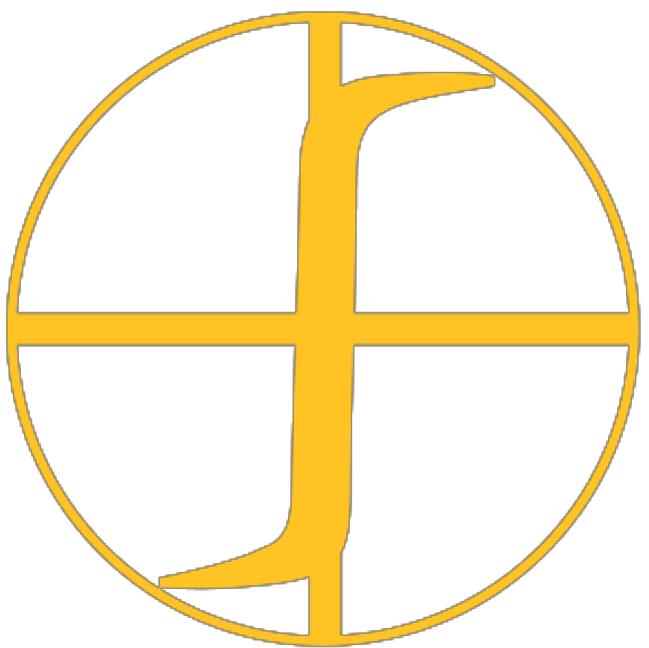




# FLUXTROL®



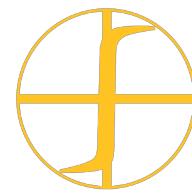
Advanced Induction Materials and Technology



O n l i n e   I n d u c t i o n   H e a t i n g   C o u r s e

# 8 Case Story - Wheel Hub Heat Treating

by. Dr. Valentin Nemkov



## Problem Description

### Heated part:

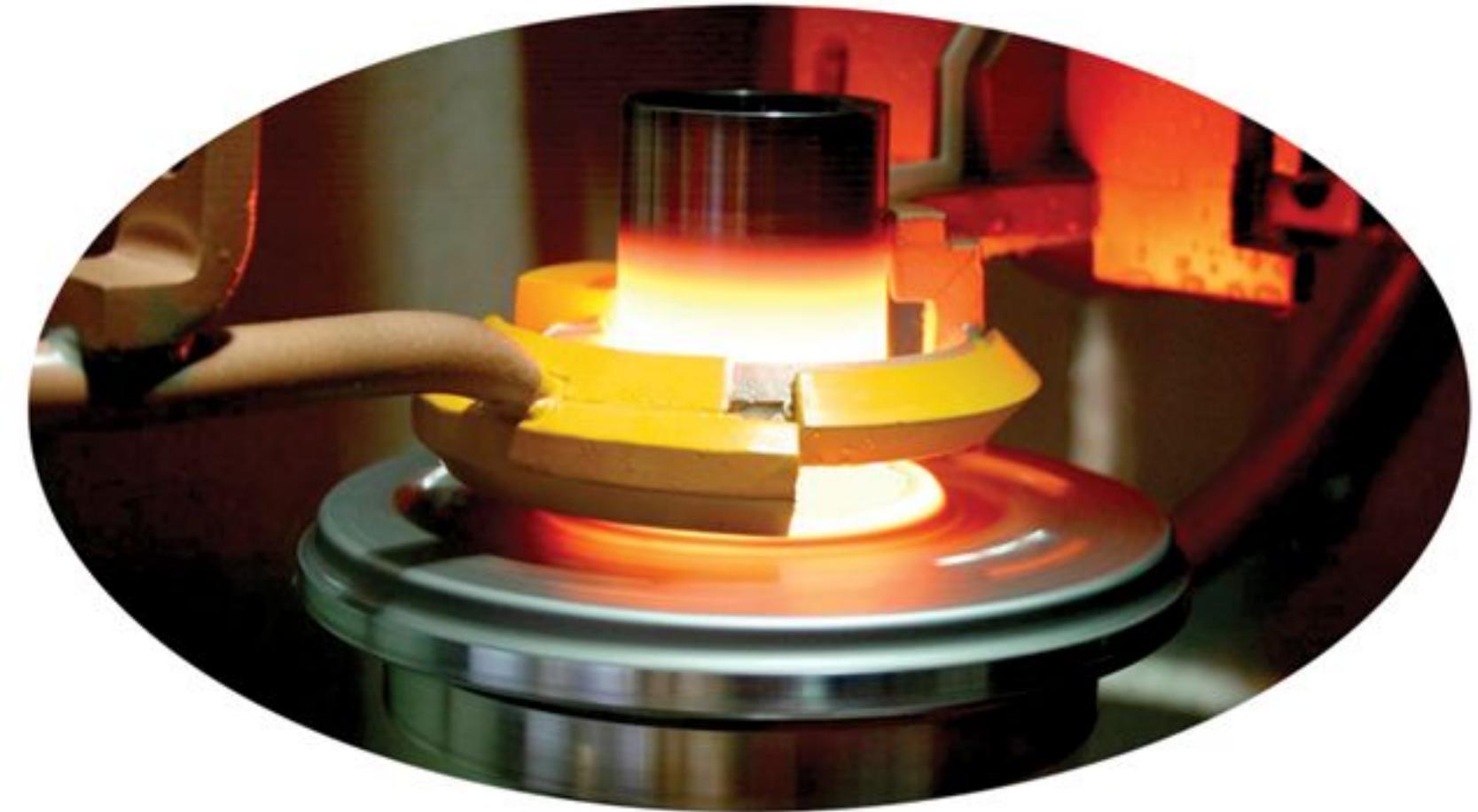
Single-race wheel hub

### Problem:

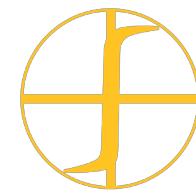
The Customer made contact due to the following:

- Short coil life – (8,000 – 13,000 pieces) resulting in:
  - Machine downtime
  - Unacceptable personnel time due to extended set-up
  - Scrap parts

Note: Inductor repair costs not a problem in this case due to manufacturer warranty



Typical process of induction heating of wheel hubs



## Step 1: Analysis of Inductor Failure

Coil failure modes:

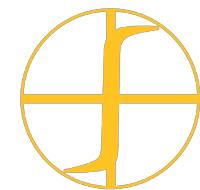
- Copper cracking under laminations due to overheating
- Lamination degradation

Previously attempted actions:

- Very high water pressure and flow rate did not solve the problem
- Partial installation of **Fluxtrol "A"** concentrator instead of laminations improved the situation but did not solve the problem

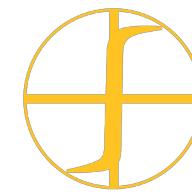


Old coil with partial replacement of laminations with **Fluxtrol "A"**

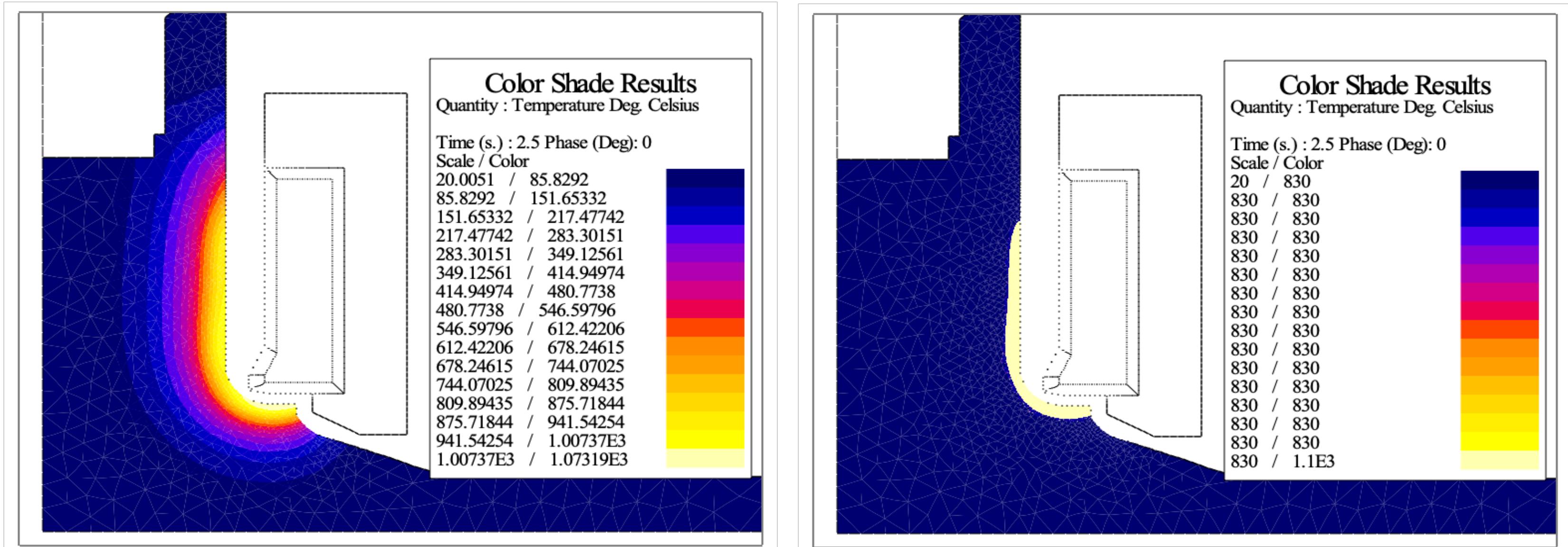


## Development Strategy

- **Step 2. (Band Aid)**
  - Complete replacement of laminations with **Fluxtrol "A"** on existing coil resulted in:
    - Lower local concentration of power in copper
    - Same heat pattern and machine settings
    - Coil Lifetime increased to 15,000 – 25,000 pieces
- **Step 3. (Optimal Solution)**
  - Design new coil with lower power concentration in copper using computer simulation
  - Build and test new coil



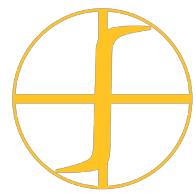
## Step 3: Development of New Induction Coil Using Computer Simulation



Temperature distribution in part with new coil design

Predicted hardness pattern

**Flux 2D program**



## Tests of New Coil

New coil with **Fluxtrol "A"** concentrator was designed, manufactured and tested in production line.

Heat pattern and coil performance were very close to parameters predicted by computer simulation.

Coil life and part production increased to >170,000 hits without coil copper failure or concentrator degradation.



New induction coil after 170,000 heating cycles

