Heating a steel wire for tempering

Objective Induction is applicable to a continuous tempering process in which wire stock is fed through an induction coil at production speeds.

Material Steel wire 3mm to 12mm diameter

Temperature 1922 ºF (1050 ºC)

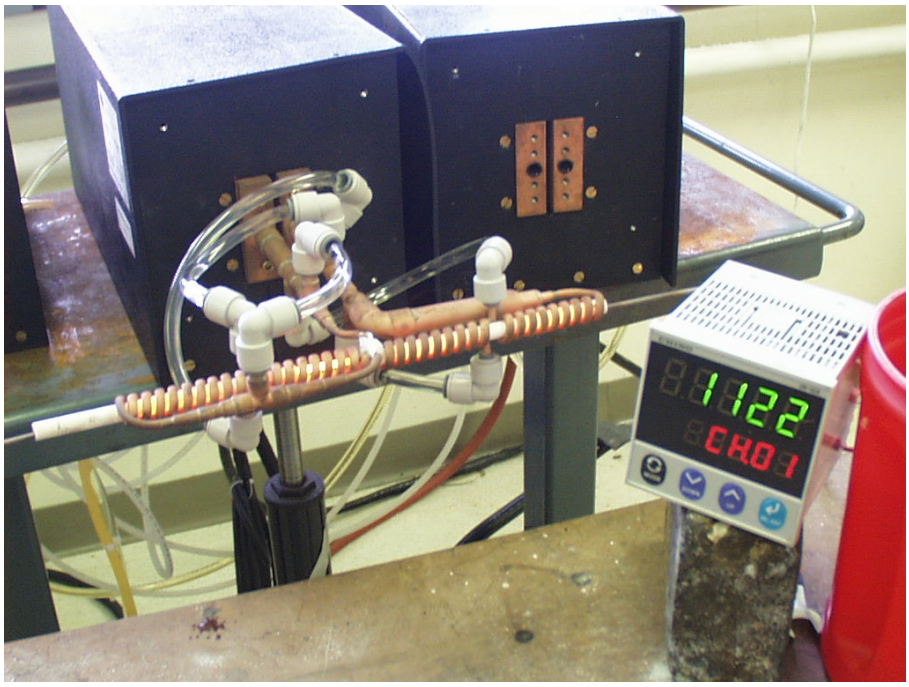
Frequency 90 kHz

Equipment
- Ambrell 65 kW, 100 kHz induction heating system, equipped with a remote workhead containing eight 1.0 µF capacitors for a total of 2 µF
- Three induction heating coils designed and developed specifically for this application to cover the range of wire diameters.

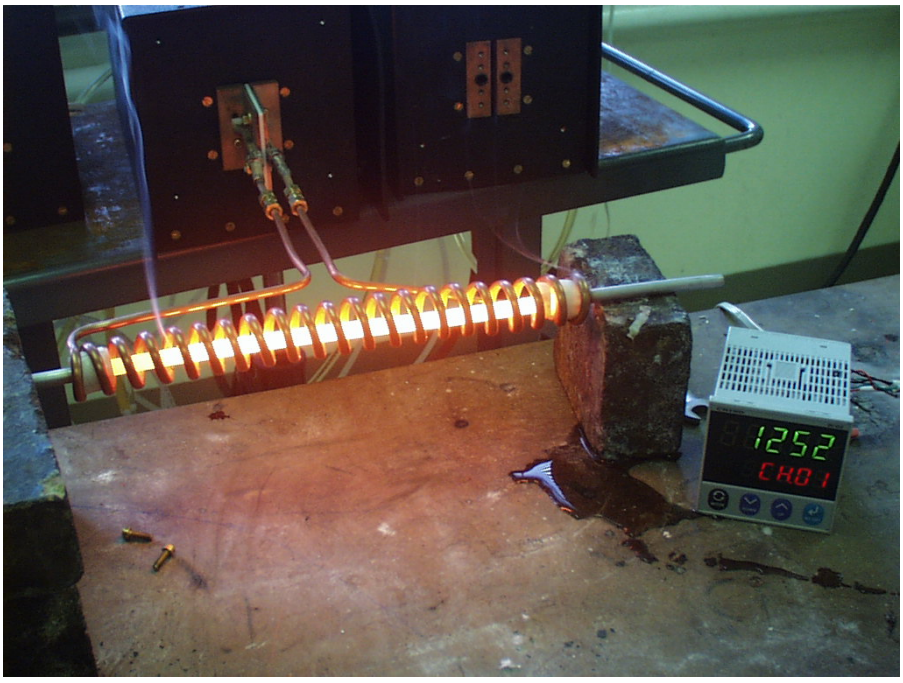
Process Wire stock is fed through a forty-turn helical coil at a rate of 6 meters/minute, reaching the desired temperature to effect the tempering process. A similar 20 turn helical coil is used for the largest wire diameter

Narrative Process required maintenance of 6 stock feed-lines into a gas-fired furnace with disappointing heat transfer into wires of smaller diameters. Induction requires 50% less energy and reduces production-line footprint by 90%

Results/Benefits Induction heating provides:
- heat directly into the wire, saving energy and time
- easy integration into production line, improving throughput
- precise control of heat
- even distribution of heat within the wire



Setup for coil through which wire is passed



Heating the greater-diameter stock