Heat Treating Steel

Mechanical Engineering

What each heat treatment cycle does, and what you get back.

For plain carbon and low alloy steels.

Treatment	What happens	Result
Annealing	Slow cool from austenite	Soft and machinable
Normalising	Air cool from austenite	Uniform grain, tougher
Quenching	Fast cool to martensite	Very hard, very brittle
Tempering	Reheat after quenching	Trades hardness for toughness
Case hardening	Add carbon at the surface	Hard skin, tough core

Hardening needs carbon: below about 0.3 per cent, plain steel will not harden usefully by quenching.