SIMHEAT®

Starting with SIMHEAT®

The time has come to discover the latest software in the Transvalor suite devoted to heat treatment processes: SIMHEAT® and the extent of its possibilities. After this course, you'll be able to get the most out of the product!

This training is your first approach to the SIMHEAT® software. The first day gives you an understanding of all of the data setup steps, how to create material files and TTT diagrams, the procedure for launching computations and how to analyze the main results. Day two will be devoted to a more thorough analysis of a complete panel of results for better interpretation of the physical phenomena. Key functions will be covered such as treatments for aluminum and heat treatments via induction as well as surface treatments.

Customizing your working environment will then be covered.

LEVEL

Beginner

PREREQUISITES

There are no prior requirements for this course.

GOALS

- **Discovering the interface for data set up and report analysis**
- **Creating your own TTT diagram using SIMHEAT®**
- **Data set up in the case of heat treatment of a forged or cold-formed part or coming from a foundry process**
- **Running a computation and analyzing the simulation results**
- **Defining the process conditions in order to obtain the best mechanical properties**
- **Be able to predict the microstructure changes during heating or cooling**
- **Observing the influence of the diffusion of carbon on the changes in surface hardness**
- **Determining the ideal treatment conditions in order to reduce cycle times**

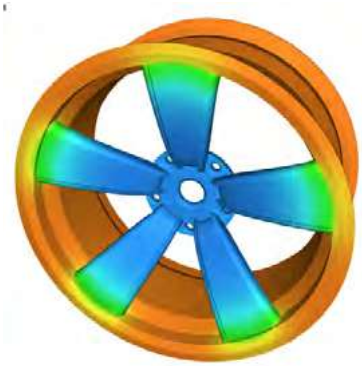
TRAINING	DURATION	PRICE EXCL. TAX	PARTICIPANTS
In-company	2 Days	2600€ per training	1 to 3 people

Contact us to arrange the date and place of the training.

DAY 1 > 8.30 a.m. to 12.00 p.m. & 1.30 p.m. to 5.00 p.m.

Introduction	· Transvalor presentation · Course goals
Data setup	· Working environment presentation · Concept of stores, processes, cases and steps · Importing geometries and *.UNV files · Surface and volume meshing · Thermal exchanges · Object handling (creation, trimming) · Starting computation
General	· Fe-Fe3C diagram · Reminder of TTT and TRC diagrams
Modeling quenching	· Approximating the TRC diagram using the TTT diagram · Exercise: generating TTT and TRC diagrams with FORGE® · Multi-physical coupled model · Exercise: model quenching in different baths (Houghton oils, polymer solutions) · Exercise: quenching via sprays
Result analysis	· Displaying results, the main scalars and vectors · Curve patterns, animations, VTFx exports · Multi-window analysis · Management of animations and exporting results
Heat treatments	· Modeling quenching – QFA model (Quench Factor Analysis) · Hardening via aluminum precipitation (artificial aging) - Shercliff-Ashby model

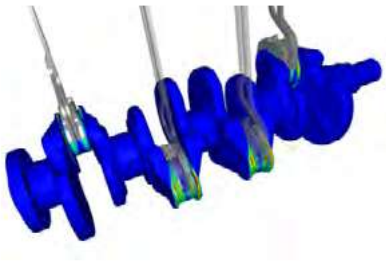
Surface heat treatment (carburizing, quenching, tempering)



Hardening via aluminum precipitation (artificial aging)

DAY 2 > 8.30 a.m. to 12.00 p.m. & 1.30 p.m. to 5.00 p.m.

Austenitizing	· Generation of material composed of perlite and ferrite · Definition of the heating cycle · Report analysis: phase transformation, austenite content, optimizing the heating cycle
Carburizing	· Generating anisotropic meshing · Defining the carbon content · TTT diagram according to the carbon content · Result analysis: carbon content, phase transformation, hardness
Tempering	· Model used to determine hardness · Exercise: modeling of tempering after quenching · Result analysis: residual stresses, hardness, etc.
Optimization	· Basic optimization principle · Determining exchange coefficient thanks to reverse analysis
Working environment customization	· Creating specific models and specific data sets (materials, heat exchanges, etc.)
Conclusion	· Questions and course assessment



Induction heating of a crankshaft