

This three-day training course covers melting of aluminium, the development of aluminium molten metal treatments designed to improve metal quality, and the technology of the DC casting process for slabs and billets.



## A fresh approach

Many technical training courses start from basic principles, building towards a detailed analysis of the particular technology. This often leaves attendees floundering in a sea of concepts and equations, unsure how the physical basics relate to the actual work place.

Our approach, based on extensive experience in delivering training courses to industry, overcomes these difficulties. We first provide an appreciation of what the various technologies are expected to deliver to their customers, and why it is important. Only then do we consider how everyday operations relate to the physical basics.



Most importantly we use hands-on workshops extensively, where attendees investigate the relationships between actuators they control (e.g. gas flow rate, casting temperature) and the performance of each manufacturing stage. Some are computer based, and some involve physical experiments.

Such 'discovery-based learning' results in a deeper understanding, and better knowledge retention and usage in the workplace.

*'I should have done this ten years ago – it was very helpful, and the workshops gave it a practical relevance'*

## Course structure

The course focuses on

- melting, alloying and mixing
- melt loss, dross formation and control
- decoating
- molten metal quality and metal treatment
- principles of DC casting technology
- heat transfer and water quality.
- sheet ingot and billet casting

The series of seminars is interspersed with frequent hands-on workshops.

## Furnaces, melting and melt loss

The key metrics for a melting furnace of melt rate, energy efficiency and melt loss are introduced, and understood in terms of heat transfer principles and oxidation kinetics. The applicability of dry hearth or submerged melting practices to different charge formats is discussed. Net and gross melt loss are defined and related to dross formation. The importance of scrap decoating to reduce melt loss is explained, and in particular the critical role of the decoating process gas and its chemistry is demonstrated.



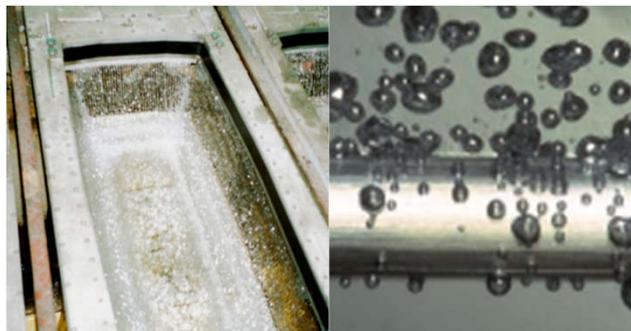
*'Great course, there was something even for remelt personnel with lots of experience'*

## Course structure (cont.)

*'The structure and presentation were excellent, but the workshops were the icing on the cake'*

### Molten Metal Treatments

The key quality measures of molten aluminium are introduced: hydrogen content, non-metallic inclusions and alkali metals. The problems encountered when their respective concentrations reach too high a level are reviewed, both in the cast operation, but also during down stream processing. Measurement technologies are reviewed, before covering options for active control, and the scientific basis explained.



### The technology of DC casting

The major elements of DC casting are introduced and their significance explained. The geometries of ingots and billets are considered, in terms of shell depth, sumps, rolling face pull-in, butt bulge and curl. Relationships between these features and process variables are described. The upstream conduction distance is explained, and used to design casting practices, focussing on low head casting, and pressure assisted casting. Heat transfer concepts are related to macroscopic heat extraction from ingots, including the effects of water quality.

### Workshops



### Presenters

**Paul Evans** and **Ricky Ricks** were formerly directors of research and innovation for Alcan. They set up **tsc** to help clients develop their technology strategy, including knowledge management and technical training.

### Registration

You may register on-line by following the details on the course web site:

[www.training.tecstrat.com](http://www.training.tecstrat.com)

Alternatively you may contact us directly at the email address: [enquiries@tecstrat.com](mailto:enquiries@tecstrat.com)

### Technology Strategy Consultants

Unit 16 Blackwell Business Park,  
Blackwell, Shipston-on-Stour, Warwickshire.  
CV36 4PE, UK

Tel:

+44 (0) 1608 682199

Fax

+44 (0) 1608 682340

e-mail:

[enquiries@tecstrat.com](mailto:enquiries@tecstrat.com)

web:

[www.tecstrat.com](http://www.tecstrat.com)