

# **BRIMACOMBE CONTINUOUS CASTING COURSE**

## **Continuous Casting of Steel Billets, Blooms and Slabs**

**April 15 to April 19, 2024**

**The Course will be held at the**

**Pinnacle Vancouver Hotel Harbourfront  
1133 West Hastings Street, Vancouver, B.C. Canada V6E 3T3**

**Sponsored by the Brimacombe Continuous Casting Society**

**[www.brimacombecourse.org](http://www.brimacombecourse.org)**

# COURSE LECTURE SCHEDULE

## BRIMACOMBE CONTINUOUS CASTING COURSE 2024

**Pinnacle Vancouver Hotel Harbourfront  
1133 West Hastings Street  
Vancouver, B.C. Canada V6E 3T3**

### **Sunday, April 14th**

5:30 - 8:00 p.m. COCKTAIL RECEPTION (with light buffet)  
Pinnacle Vancouver Hotel Harbourfront  
Ballroom Foyer, 2<sup>nd</sup> Floor

### **Monday, April 15th**

7:00 - 7:30 a.m. Continental Breakfast and Registration Confirmation, Ballroom Foyer  
7:30 - 7:45 a.m. Welcome to Course (IVS)  
7:45 - 8:00 a.m. Tribute to Keith Brimacombe (IVS)  
8:00 - 8:30 a.m. Brief Introduction to Continuous Casting Systems (RJO)  
8:30 - 8:45 a.m. BREAK  
8:45 - 9:45 a.m. Considerations in Caster Operation (RJO)  
9:45 - 10:30 a.m. Inclusion Defects (RJO)  
10:30 - 11:30 a.m. Chemistry Control (RJO)  
11:30 - 12:15 p.m. Slags for Ladle and Tundish (RJO)  
12:15 - 1:30 p.m. LUNCH BREAK  
1:30 - 2:15 p.m. Slag-Metal Interface Phenomena (RJO)  
2:15 - 2:30 p.m. BREAK  
2:30 - 3:30 p.m. Cleanliness Control (RJO)  
3:30 - 4:15 p.m. Caster Operation to Minimize Oxide Defects (RJO)  
5:00 p.m. Walk to Marina  
6:00 - 9:00 p.m. HARBOUR CRUISE WITH COCKTAILS AND DINNER  
(SPOUSES INCLUDED)

### **Tuesday, April 16th**

7:00 - 7:30 a.m. Continental Breakfast, Ballroom Foyer  
7:30 - 8:30 a.m. Caster Operation to Minimize Oxide Defects (RJO)  
8:30 - 8:45 a.m. BREAK  
8:45 - 10:30 a.m. Basic Aspects of Moulds (BGT)  
10:30 - 11:30 p.m. Introduction to Mould Powders (RJO)  
11:30 - 12:15 p.m. Mould Powders (RJO)  
12:15 - 1:30 p.m. LUNCH BREAK  
1:30 - 3:30 p.m. Aspects of Mould Oscillation (ESS)  
3:30 - 3:45 p.m. BREAK  
3:45 - 5:30 p.m. Fluid Flow in the Mould (BGT)

### Wednesday, April 17th

7:00 - 7:30 a.m.	Continental Breakfast, Ballroom Foyer
7:30 - 9:15 a.m.	Strand Solidification on a Macroscale – Empirical Methods (ESS)
9:15 - 9:30 a.m.	BREAK
9:30 - 11:00 a.m.	Solidification on a Microscale and
11:00 - 12:00 p.m.	Solidification-Related Imperfections (ESS)
12:00 - 1:15 p.m.	LUNCH BREAK
1:15 - 2:30 p.m.	Mould Heat Transfer (BGT)
2:30 - 3:15 p.m.	Below-Mould Heat Transfer (BGT)
3:15 - 3:30 p.m.	BREAK
3:30 - 4:30 p.m.	Intermixing During Grade Transitions (BGT)
4:30 - 5:30 p.m.	High-Temperature Mechanical Properties of Steel (BGT)

### Thursday, April 18th

7:00 - 8:00 a.m.	Canadian Breakfast in the Vistas 360 (19 <sup>th</sup> Floor)
8:00 - 9:30 a.m.	Crack Formation (IVS)
9:30 - 9:40 a.m.	Presentation of Course Certificates
9:40 - 10:00 a.m.	BREAK (Divide Lecture Room)
10:00 - 11:00 a.m.*	I Billet Mould Design, Operation, and Maintenance (IVS) II Nozzle Design and Flow Issues in Slab Casting (BGT)
11:00 - 12:00 p.m.	I Billet Mould Tapers, Oil Lubrication and Billet Quality (IVS) II Slab Mould Behaviour (BGT)
12:00 - 1:15 p.m.	LUNCH BREAK
1:15 - 3:00 p.m.	I Mould Oscillation and Upsets in Billet Casting (IVS) II Slab Mould Tapers, Slag Lubrication and Quality (BGT)
3:00 - 3:15 p.m.	BREAK
3:15 - 4:15 p.m.	I Defects in Billet Casting – Wrap up (IVS) II Online Detection of Breakouts and Slab Quality Problems (BGT)
4:15 - 5:30 p.m.	I Panel Discussion on Billet Casting (IVS/ESS) II Panel Discussions on Slabs/Bloom Casting (RJO/BGT)

### Friday, April 19th

7:00 - 7:30 a.m.	Continental Breakfast, Ballroom Foyer
7:30 - 8:45 a.m.	Spray Cooling and Related Defects (IVS)
8:45 - 9:00 a.m.	BREAK
9:00 - 10:00 a.m.	Containment in the Submould Region (ESS)
10:00 - 11:30 a.m.	Casting Defects and Product Performance Case Studies (BGT & RJO)
11:30 - 12:00 p.m.	Challenges in High Speed Casting (BGT)
12:00 p.m.	COURSE ENDS

**NOTE: Audio and/or video taping of lectures is not permitted.**

**\*Groups divided into billets and slabs/blooms for simultaneous sessions.**

## GENERAL INFORMATION

The Course will be held at the Pinnacle Vancouver Hotel Harbourfront in downtown Vancouver. The hotel is located at 1133 West Hastings Street, Vancouver, B.C. Canada V6E 3T3. A limited block of rooms has been reserved for course attendees at a reduced rate. This special rate only applies to room reservations made on or before March 15, 2024, so **MAKE YOUR RESERVATION EARLY!** Room reservations can most easily be made via links on our website <[www.brimacombecourse.org](http://www.brimacombecourse.org)>. The website also includes a phone number for the hotel. However, to obtain the special rate when making reservations by phone you must **STATE THAT YOU ARE ATTENDING THE BRIMACOMBE CONTINUOUS CASTING COURSE**. The most convenient means of transportation between the Vancouver International Airport and the Pinnacle Vancouver Hotel Harbourfront is by taxi (about \$45). An alternative means is via the Canada Line SkyTrain at a cost of \$9.45. The exit station is within 3 blocks of the Pinnacle Vancouver Hotel Harbourfront. You can buy tickets from the ticket vending machines located at the Canada Line Station in the airport. An informative guide to Vancouver travel and other attractions can be found at: <http://www.vancouver-travel-tips.com>. Many excellent restaurants are located within easy walking distance of the hotel. Western business casual is typical dress for the Course. **U.S. CITIZENS: PLEASE NOTE THAT YOU MUST POSSESS A VALID U.S. PASSPORT FOR CUSTOMS.**

## ADDITIONAL INFORMATION

The Brimacombe Continuous Casting Society is incorporated in the Province of British Columbia, Certificate No. S-54179. The Society cannot and will not fill out any "Vendor Forms" nor any tax-related forms for foreign countries.

## INSTRUCTORS

**Dr. Indira V. Samarasekera:** Senior Advisor, Bennett Jones LLP. Member of the National Academy of Engineering. Previously President and Vice-Chancellor, University of Alberta and Vice President Research, University of British Columbia. Expert in heat flow and stress analysis with extensive experience in mould design and its effect on quality.

**Dr. Brian G. Thomas:** Professor of Mechanical Engineering, Colorado School of Mines at Golden, Colorado, and Director of the Continuous Casting Centre. Over 35 years of experience conducting research on the continuous casting of steel. Expert in computational modeling.

**Dr. Edward S. Szekeres:** Principal Consultant, Casting Consultants, Inc. His experience includes over 20 years at U.S. Steel Research plus over 36 years as an independent consultant on continuous casting of steel. Expert on strand solidification and caster design.

**Dr. Ronald J. O'Malley:** Professor and also Director of the Kent D. Peaslee Steelmaking Manufacturing Research Center, Missouri University of Science & Technology. Previous positions: Researcher, Armco Inc.'s Technology Center, chief metallurgist at Nucor Steel-Decatur LLC. AIST Distinguished Member and Fellow. Expertise in clean steel and thin-slab continuous casting technologies.

## REGISTRATION

REGISTRATION FOR THE COURSE CAN ONLY BE MADE BY SUBMITTING THE FORM POSTED ON OUR WEBSITE: [www.brimacombecourse.org](http://www.brimacombecourse.org). Once the Course classroom fills up to capacity, the Registration form will be removed from our website and there will be no other way to register. When you register for the course, both an information letter and an invoice will be emailed to you. For registration to be complete, the full fee must be sent to the address given below by March 15, 2024. Payment can be either by cheque or by wire transfer. Upon payment, a confirmation number will be issued, and the registration process is complete. **A confirmation number is required for admittance.** If the fee is not prepaid, the application will be cancelled on March 16, 2024. Registration after March 16<sup>th</sup> is subject to space availability and must be accompanied by the fee. A cancellation charge of 20% of the fee will be levied for withdrawal of a registration after March 16<sup>th</sup>. The Brimacombe Continuous Casting Society reserves the right to cancel or reschedule the course.

## THE BRIMACOMBE CONTINUOUS CASTING SOCIETY

Mary Jansepar

Course Coordinator

44 North Howard Avenue

Burnaby, B.C. V5B 1J5

CANADA

Cell: (604) 916 2659

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# BRIMACOMBE CONTINUOUS CASTING COURSE – 2024

## Continuous Casting of Steel Billets, Blooms and Slabs

**TIME** Monday, April 15 to Friday, April 19  
7:00 a.m. to 6:00 p.m.

**PLACE** Pinnacle Vancouver Hotel Harbourfront  
1133 West Hastings Street  
Vancouver, B.C. Canada V6E 3T3

**FEE** **Either** \$4,500 CDN or \$3,300 US

### WHO WILL BENEFIT

The Brimacombe Continuous Casting Course is designed for people who are concerned with controlling and improving the quality and production rate of continuously cast steel shapes. Persons who will benefit include shop floor operating personnel, quality control and research personnel, management personnel and individuals in support industries associated with continuous casting.

### COURSE DESCRIPTION

Topics to be covered include chemical interactions, steel cleanliness, transfer operations, fluid flow, tundish metallurgy, mould design/behaviour, spray systems, heat extraction, solidification, segregation, electromagnetic stirring, crack formation and newer technologies such as thin slab casting. The Course offers a practical understanding of the continuous-casting process and quality based on fundamental principles and deals with problems commonly experienced in production. Much of what will be presented and discussed is based on our research, some of it unpublished, which spans a forty-year time period.

### CORRESPONDENCE AND INFORMATION

The Brimacombe Continuous Casting Society  
Mary Jansepar  
Course Coordinator  
44 North Howard Avenue  
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CANADA

Cell: (604) 916 2659

Email: [info@brimacombecourse.org](mailto:info@brimacombecourse.org) (Mary Jansepar)

Website: [www.brimacombecourse.org](http://www.brimacombecourse.org)

### COURSE CO-DIRECTORS:

Dr. Indira V. Samarasekera

Dr. Edward S. Szekeres

**\*\* *The Brimacombe Continuous Casting Society is a Canadian non-profit organization.* \*\***