4 p.m. Registration

TUESDAY 10 SEPTEMBER 2013

7 a.m. Continental Breakfast and Registration

8 a.m. Overview of the Making, Shaping and Treating of Steel and History of the Industry
The first session overviews the technologies used to produce steel today and the evolution of world steel production. The general chemistry of steel is introduced to help illuminate the principles of iron- and steelmaking. This session ends with a brief history of metals production and an introduction to early iron- and steelmaking processes.

10 a.m. Break

10:15 a.m. Secondary Steelmaking, Ladle Metallurgy, Slags and Steel Plant Refractories
Basic, acid and neutral slags and refractories will be introduced, along with reasons for using each. The interaction of refractories and slags with the metal will be explored, including methods of reducing refractory wear and quality improvements. The use of ladle metallurgy treatment and furnaces will be explained. The principles behind other secondary steelmaking techniques will be explained, including degassers and argon oxygen decarburization steelmaking for the production of high-quality steels, including ultralow-carbon and stainless steels. Inclusion formation, modification and removal will be discussed.

3 p.m. Break

3:15 p.m. Solidification of Steel — Continuous Casting, Defects and Prevention
The importance of solidification on final product quality will be discussed. The history and evolution of continuous casting processes from billets, blooms, and slabs to near-net-shape processes for thin slabs, strip, beam blanks and wire will be reviewed. The effects of tundish and mold metallurgy on product quality will be explained, along with casting defect causes and methods of prevention.

5 p.m. Reception
WEDNESDAY  
11 SEPTEMBER 2013

Presented by

ROBERT E. GREUTER
director services, Long Product – Services USA, Danieli Corp.

7 a.m.
Continental Breakfast

8 a.m.
INTRODUCTION — END PRODUCTS
The various end products of steel manufacturing will be introduced. The requirements and methods to produce these products will be reviewed.

9 a.m.
Break

9:15 a.m.
ROLLING — STEEL DEFORMATION PROCESS
This section will provide an introduction to the theory of rolling and the effects of deformation processing on product quality and properties. The importance of the reheating process and how it affects subsequent rolling and quality will be discussed. Billets and blooms will also be reviewed.

Noon
Lunch

1 p.m.
STEEL — TYPES AND PROPERTIES
Characteristics, applications, and mechanical properties of steel alloys and grades will be explored. The effects of different alloying elements on steel manufacturing and final properties will be explained. An introduction of the methods of testing the properties of steel — including tensile, toughness and fatigue testing — will lead into discussions of the importance of melting, casting, rolling and forming on the final mechanical properties. The importance of selecting alloys and processing routes for specific engineering applications to achieve desired properties will be explained.

2:30 p.m.
CLASSIFICATION OF DEFECTS
A review of defects in hot and cold formed products will include their origin, how they adversely affect final products and how to prevent them.

3:45 p.m.
Break

4 p.m.
DOWNSTREAM PROCESSING
Steel finishing techniques, including heat treating and coating will be reviewed. Basic steel heat treatment concepts of quenching, tempering, case hardening and in-process annealing will be introduced, along with the effects they have on steel microstructure and properties. Surface coating techniques, including galvanizing and other coating will be discussed.

THURSDAY  
12 SEPTEMBER 2013

7 a.m.
Continental Breakfast

8 a.m.
PLANT TOUR OF TMK IPSCO KOPPEL TUBULARS CORP., KOPPEL AND AMBRIDGE PLANTS

Noon
Return From Tour and Adjourn