



75 Scarsdale Road
Toronto, Ontario
M3B 2R2
Tel (416) 391-3755
Fax (416) 391-3645

OPERATOR TRAINING PROJECT REFERENCE LIST

August 2009

COURSES OPEN TO THE STEEL INDUSTRY

Presented in Toronto, Ontario, Canada

- **QRC1: Pass Design and Rolling Theory for Bar and Light Structural Mills.** Topics include rolling theory for rounds and flats, cooling water theory, mill equipment overviews, speed control theory, guiding and operating issues.
- **QRC2: Applied Rolling of Rounds and Flats.** Topics include Pass Design, Set-up Sheets, Mill Operation, Defect Analysis and Troubleshooting techniques. Involves actual rolling of shaped product on Quad's laboratory mill.
- **QRC3: Applied Rolling of Angles.** Topics include pass design, set-up sheets, mill set-up and troubleshooting defects. Involves actual rolling of angle shaped product on Quad's laboratory mill.
- **QRC5: Basic Rolling Metallurgy.** Topics include steel classification, rolling requirements, chemical composition, microstructure, controlled cooling and rolling defects.
- **QRC7: Basic Melt Shop Operation.** Topics include EAF, ladle refining, continuous casting, chemical metallurgy, and physical metallurgy. The heat sheet and elements of least cost melting are considered throughout the course.
- **QRC8: Applied Rolling of Slit Rebar.** Topics include Pass Design, Set-up Sheets, Mill Operation, Defect Analysis and Troubleshooting techniques. Involves actual rolling of 2-strand and 3-strand slit bar on Quad's laboratory mill.

CUSTOMIZED ON-SITE OPERATOR TRAINING COURSES

BAR & SBQ MILL:

- One 2-day basic rolling theory training course for rolling mill and set-up shop personnel. Topics included pass design and troubleshooting of flats, angles and channels, speed control, guiding and product set-up.
- 3-day basic rolling theory training course for all rolling mill and set-up shop personnel. Topics included pass design and troubleshooting of SBQ rounds, speed control, guiding and product set-up.
- Quarterly one day continuous improvement training classes focusing on current operating issues plus time spent working with the mill crews during shift operation.
- 2-day basic rolling theory training courses for four crews of rolling mill and set-up shop personnel. Topics included pass design and troubleshooting of rounds, rebar, flats and angles, speed control, guiding and product set-up. A list of projects to improve the mill operation was developed

- 2-day basic rolling theory training courses for rolling mill and set-up shop personnel. Topics included pass design and troubleshooting of rounds and rebar, speed control, guiding and product set-up. A list of projects to improve the mill operation was developed
- 3-day training course for Auburn operating and maintenance personnel. Topics included pass design and troubleshooting of rounds, flats and angles, speed controls and guiding/set-up.
- 2-day basic rolling theory training courses for rolling personnel. Topics included pass design and troubleshooting of rounds and flats, speed control and guiding/set-up.
- 2-day basic rolling theory training courses for rolling personnel from 4 crews. Topics included pass design and troubleshooting of channel, angles, flats and rounds, speed control and guiding/set-up. Current rolling issues and defects were addressed. Work sessions were developed based on the actual pass design, mill layout and operation. A list of projects to improve the mill operation was developed.
- 4-day Hands-on Angle rolling theory training courses for rolling personnel. Topics included pass design and troubleshooting of angles and flats, speed control and guiding/set-up. Current rolling issues and defects were addressed. Work sessions were developed based on the actual pass design, mill layout and operation. Hands on session held during two days of angle rolling were used to reinforce the theory covered in the classroom.
- 2-day presentations of comprehensive training course on the rolling of rounds, flats, angle and channel for four Bar Mill crews. Course was designed to cover current rolling issues using pass design and set-up sheets form the mill.
- 3-day presentation of comprehensive training course on the rolling of rounds, flats angle and channel for four Bar Mill crews. Course was designed to cover the new 18 stand no-twist mill installation. The pass design, set-up sheets, operation and start-up of the new mill were the main focus. Issues and concerns arising from the new mill were addressed. A comprehensive report suitable for using in meetings with the various equipment suppliers was developed.
- 2-day presentations of comprehensive training course on the rolling of rounds, and Rebar for four mill crews. Course was designed to cover current rolling issues using pass design and set-up sheets form the mill. A list of projects to improve the mill operation was developed.
- Two 2-day presentations of how to improve mill operation through refining the setup sheets and rolling Using R-factors. The course resulted in the identification of some problem products that were improved through pass design and setup sheet changes.
- 2-day presentations of a comprehensive training course on the rolling of rounds, flats, angle and channel for four Bar Mill and four Structural Mill Operating crews. Course was designed to cover current rolling issues using pass design and set-up sheets form the mill. A list of projects to improve the mill operation was developed for implementation by the Operators.

- 2-day presentations of a comprehensive training course on the rolling of rounds and rebar for all operating crews. Course was designed to cover current rolling issues using pass design and set-up sheets from the mill.
- 2-day courses on how to roll using R-Factors. All mill crew personnel and selected Maintenance & Finishing personnel attended.
- Monthly on-site training (over a period of 2-years) of the rolling crews during normal operation on how to roll more effectively and reduce cobbles by Rolling Using R-factors. A special measuring and monitoring method was developed and implemented in the mill.
- Four 2-day presentations of a comprehensive training course on the rolling of rounds, flats, angle and channel for Bar Mill and Structural Mill Operating crews from 2 different Plants. Course was designed to cover current rolling issues using pass design and set-up sheets from the mill. A list of projects to improve the mill operation was developed for implementation by the Operators.
- 4-day basic rolling theory course for SBQ rounds. Course was designed to give all operations and maintenance personnel a general understanding of rolling theory.
- 2-day basic rolling theory training courses for all four rolling mill crews. Topics included pass design and operation of rounds and flats, speed control, defect analysis, guiding/set-up.
- Two basic rolling theory courses on SBQ rounds. Course was designed to give all operations and maintenance personnel a general understanding of rolling theory.
- Hands-on Operator training during shift operation commissioning all product section sizes. Included refining the setup sheets to reflect the actual rolling practice.
- 2-day training course for rolling of rounds, rebar, flats and angle. Included all mill operators in the rolling mill. Topics included pass design, roll cooling, speed control and guiding/set-up. A list of projects to improve the mill operation was developed.
- 3-day presentation of comprehensive training course on the rolling of SBQ and special alloy rounds. Course was designed to cover current rolling issues using pass design and set-up sheets from the mill. The course covered 3hi mill, 2-hi mill and Kocks block 3-roll technology. A list of projects to improve the mill operation was developed.

ROD MILL:

- 2-day training courses for mill engineering and operations personnel. Topics included pass design, and troubleshooting and rebar and rod, speed control, rod block operation, guiding and product set-up.
- 3-day basic rolling theory courses for all new rolling mill personnel. Topics included mill equipment overview, rolling process basics, pass design for rounds, speed control and guiding.
- 2-day mill operation and set-up courses emphasising mill set-up and troubleshooting.
- 2-day presentations of comprehensive training course on the rolling of rounds and rod for four Rod Mill crews. Course was designed to cover current rolling issues using pass design and set-up sheets from the mill. A list of projects to improve the mill operation was developed.

STRUCTURAL MILL:

- 5-day basic rolling theory training courses for all rolling personnel. Topics included pass design and troubleshooting of beams, channel, angles and flats, speed control and guiding/set-up. Current rolling issues and defects were addressed. Work sessions were developed based on the actual pass design, mill layout and operation. A list of projects to improve the mill operation was developed. Hands on session held during the mill operation were used to reinforce the theory covered in the classroom.
- Eight 2-day basic rolling theory training courses to Lasco operators, maintenance and engineering personnel. Topics included pass design and troubleshooting of rounds and flats, speed control, electrical motors and guiding/set-up.
- Six 2-day training courses on the design and operation of a new 15 stand structural mill. Topics included assembly; maintenance and operation of screw down, axial adjust chocks, tables, utilities, controls and a complete roll change procedure.
- A series of two-day courses for members of all the rolling crews on the rolling of wide flange universal beams, channels, angles and flats. Topics mixed classroom theory with hands on building and setting of the mill stands off line.
- Two 5-day courses for members of all the rolling crews, set-up and maintenance on the rolling of wide flange universal beams. Topics mixed classroom theory with hands on chocking, build-up, teardown and setting of the mill stands off line.
- 10-day basic rolling theory training courses for rolling mill personnel and managers. Topics included pass design and troubleshooting of rounds, rebar, flats, beams, rail and angles, speed control, guiding, roll cooling and product set-up.
- 4-day presentation of comprehensive training course on the rolling of wide flange beams presented to all operating personnel and support staff. Course was designed to give all operations and maintenance personnel a general understanding of beam mill rolling theory, machinery operating principles and utility systems operating principles.

- 2-day Presentation of a specialized roller's course for rolling wide flange beams. Course content included Rolling Theory, drafting practice, operating considerations and start-up methods.
- 2-day presentations of a comprehensive Basic rolling metallurgy training course for all operators and managers of two Universal rolling mills and the melt shop. The course was designed to cover current metallurgy and quality issues. Topics included steel classification, rolling requirements, chemical composition, microstructure, controlled cooling and rolling defects. A list of projects to improve the operation was developed.
- 4-day rail-rolling course for operators and supervisors. Topics included pass design and troubleshooting of rail, equipment theory and operation, guiding and quality issues.
- 4-day training course for rolling of beams. Included all mill operators in the rolling mill and finishing end. Topics included beam pass design, roll cooling, product cooling, speed control and guiding/set-up.
- 2-day presentations of comprehensive training course on the rolling of flats, angle, beam and channel for three mill and set-up shop crews. Course was designed to cover current rolling issues using pass design and set-up sheets from the mill. A list of projects to improve the mill operation was developed.
- 5-day training course for the set-up and operation of a universal beam rolling mill. Classroom theory and hands on sessions included chock maintenance, stand build-up, stand teardown and stand set-up.
- Three 3-day comprehensive training courses on the rolling of wide flange beams. Course was designed for training of foremen and supervisors on modern rolling theories and methods.

MELT SHOP:

- Four 2-day basic melt shop operating theory courses for all melt shop operations, maintenance and engineering personnel. Topics included EAF, ladle refining, casting and chemical metallurgy.
- 2-day presentations of a comprehensive Basic rolling metallurgy training course for all operators and managers of two Universal rolling mills and the melt shop. The course was designed to cover current metallurgy and quality issues. Topics included steel classification, rolling requirements, chemical composition, microstructure, controlled cooling and rolling defects. A list of projects to improve the operation was developed.
- Two 3-day basic melt shop operating theory courses for all melt shop operations & Quality Control personnel in an SBQ melt shop. Topics included EAF, ladle refining, casting and chemical metallurgy.