References

[1] H.F. Schrewe. *Continuous Casting of Steel—Fundamental Principles and Practices.* Verlag Stahleisen, Düsseldorf, english edition, 1987. Translated by Paul Knighton.

[2] H.-F. Marten. New approaches in plant technology to increase quality and productivity. *Metallurgical Plant and Technology*, 9(5):39–55, 1986.

[3] H. Wiesinger, G. Holleis, K. Schwaha, and F. Hirschmanner. Design of CC machines for hot charging and direct rolling. In T.B. Harabuchi and R.D. Pehlke, editors, *Continuous casting*, volume Four, Design and Operations, pages 227–255. The Iron and Steel Society, Warrendale, 1988.

[4] G. Holleis, H. Bumberger, T. Fastner, F. Hirschmanner, and K. Schwaha. Prerequisites for production of continuously cast semis for direct rolling and hot charging. In *Continuous Casting '85*, pages 46.1–46.7, London, 1985.

[5] F. Hollander and S.P.A. Zuurbier. Accurate temperature control of the reheating process at mixed cold and hot charging. In *Scanheating: Proceedings of the International Conference on Process Control and Energy Savings in Reheating Furnaces, June 12-14, Luleå, Sweden*, pages 6.1–6.36, 1985.

[6] J.A. Doherty. Linking continuous casting and rolling. In T.B. Harabuchi and R.D. Pehlke, editors, *Continuous casting*, volume Four, Design and Operations, pages 209–211. The Iron and Steel Society, Warrendale, 1988.

[7] V.V. Orobtsev, R.O. Perel'man, and A.D. Belyanskii. Problems with organizing the hot-charging of continuous-cast slabs. *Metallurg*, 32(11-12):37–38, November 1988. Translation.

[8] D. Kothe, F.-P. Pleschiutschnigg, and F. Boehl. Slab and strip casting technology. *Steel Times International*, 14(2):36,38, March 1990.

[9] N.L. Samways. LTV Steel's new direct hot charge complex and continuous anneal line at Cleveland. *Iron and Steel Engineer*, 71(9):CI–111–CI–122, 1994.

[10] N. Moritama, O. Tsubakihara, M. Okimori, E. Ikezaki, and K. Isogami. Techniques for producing defect-free slabs at high enough temperatures for direct rolling. *Iron and Steelmaker*, 14(8):22–28, August 1987.

[11] K.H. Klein, G. Paul, and V. Koster. Substantial energy-saving measures at continuous casting facility in West Germany. *Industrial Heating*, 53(11):24–29, November 1986.

[12] H. Preißl, J. Weiß, Norbert Hübner, J. Spiess, and F. Milani. Process optimization for maximum availability in continuous casting. *Metallurgical Plant and Technology International*, 17(5):52–58, 1994.

[13] T. Fastner, H. Preißl, N. Hübner, H.-P. Narzt, J. Vlcek, and W. Marschal. Automatisierte Qualitätssteuerung beim Stranggießen von Brammen für den Heißeinsatz. *Stahl und Eisen*, 114(11):57–62, 1994.

[14] G. Steinbauer and W. Siefer. Informationstechniken zur Gußfehlerdiagnose und ihre Einfügung in die EDV-gestützte Betriebskontrole. *Giessereiforschung*, 40(3):81–94, 1988.

[15] R.C. Creese, M. Jaraiedi, and S. Waibogha. A quality control system for casting defects. In *40th Annual Quality Control Proceedings, 19–21 May, Anaheim, USA*, pages 89–95. American Society for Quality Control, 1986.

[16] N.L. Samways. Continuous casting at Sparrows Point: A success story. *Iron and Steel Engineer*, 64(10):17–25, October 1987.

[17] K. Hatanaka, T. Tanaka, and H. Kominami. Breakout forecasting system based on multiple neural networks for continuous casting in steel production. *Fujitsu Scientific and Technical Journal*, 29(3):265–270, September 1993.

[18] N.S. Hunter, A.S. Normanton, D. Scoones, A. Spaccarotella, M. Milone, F. Vicino, J.Y. Lamant, H. Morand, and P. Do Thong. The influence of mould metallurgy on surface defects in peritectic carbon and austenitic stainless steels. *La Revue de Métallurgie-CIT*, 96(4):473–482, April 1999.

[19] K. Matsuzuka, N. Fujita, T. Yabuta, and H. Itoh. Advanced direct rolling operation realized by a schedule-free rolling technology at Yawata Works. *La Revue de Métallurgie-CIT*, 86(5):413–422, May 1989.

[20] I.K. Craig, F.R. Camisani-Calzolari, and P.C. Pistorius. A contemplative stance on the automation of continuous casting in steel processing. *Control Engineering Practice*, 9(9):1013–1020, 2001. Suggested from [28].

[21] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. Quality prediction in the continuous casting of stainless steel slabs using time-series methods. *ISIJ International*, 2003. Submitted.

[22] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. Mould temperature control in continuous casting for the reduction of surface defects. *ISIJ International*, 2003. Submitted.

[23] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. Quality prediction in continuous casting of stainless steel slabs. *Journal of the South African Institute of Mining and Metallurgy*, 2003. Submitted, suggested from [29].

[24] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. A proposed control system/CAQC methodology and prediction system for the improvement of surface defects in the continuous casting of slabs. In *Preprints of the IFAC Workshop on Future Trends in Automation in Mineral and Metal Processing, Finland, 22–24 August*, pages 402–406, 2000.

[25] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. A prediction system based on system identification techniques for the eradication of surface defects in the continuous casting of slabs. In *Proceedings of the 3rd International Conference on Control Theory and Applications, Pretoria, South Africa, 12–14 December*, pages 162–166. IEEE, 2001.

[26] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. Control structure for the reduction of defects in continuous casting. In *Proceedings of the 15th IFAC World Congress, Barcelona, Spain, 21-26 July*, volume O, pages 149–154, 2002.

[27] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. Defect and mould variable prediction in continuous casting. In *31st International Symposium on Computer Applications in the Minerals Industries (APCOM 2003), Cape Town, South Africa, 14-16 May*, 2003. Accepted.

[28] I.K. Craig, F.R. Camisani-Calzolari, and P.C. Pistorius. A contemplative stance on the automation of continuous casting in steel processing. In *Preprints of the IFAC Workshop on Future Trends in Automation in Mineral and Metal Processing, Finland, 22–24 August*, pages 80–85, 2000.

[29] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. Quality prediction in continuous casting of stainless steel slabs. In *Colloquium on the state of the art of automation and control in the minerals and metals processing industries, Johannesburg, South Africa, 18 March*, pages 1–17. SAIMM, 2003. Paper 1, Session 2.

[30] F.R. Camisani-Calzolari, I.K. Craig, and P.C. Pistorius. An overview of surface defects in continuous casting. In *IFAC Workshop on New Technologies for Automation of Metallurgical Industry, Shanghai, China, 11-13 October*, 2003. Accepted.

[31] G.E.P. Box, G.M. Jenkins, and G.C. Reinsel. *Time series analysis–forecasting and control*. Prentice Hall, Englewood Cliffs, 1994.

[32] R.L. Hill and J.H. Wilson. Reliable liquid steel flow control contributes to productivity, cast slab quality and machine availablity at US Steel Gary Works. In *Continuous Casting '85*, pages 52.1–52.7, London, 1985.

[33] G. Harry. *Mold Powders for Continuous Casting and Bottom Pour Teeming*. Iron and Steel Society, Warrendale, 1987.

[34] J.M. Burgess, H.M. Guzman, and Y.P. Singh. Mold oscillator mechanisms for continuous casters, synthesis and computerized design. In *Proceedings of the 1989 ASME International Computers in Engineering Conference and Exposition, 3 August–30 July, Anaheim, USA*, volume 1, pages 257–264, 1989.

[35] F.R. Camisani-Calzolari. Modelling and control of the secondary cooling zone in continuous casting. Master's thesis, University of Pretoria, 1998.

[36] K. Brückner. New technologies and facilities for continuous casting and rolling of steel. *Metallurgical Plant and Technology*, 11(6):34–44, 1988.

[37] J.-P. Birat, M. Larrecq, J.-Y. Lamant, and J. Pétégnief. The continuous casting mold: a basic tool for surface quality and strand productivity. In *Steelmaking Conference Proceedings, Warrendale, USA*, pages 39–50, 1991.

[38] R. De Keyser. Predictive mould level control in a continuous steel casting line. In *Proceedings of the 13th IFAC Triennial World Congress, 30 June–5 July, San Francisco, USA*, pages 487–492, 1996.

[39] R.M.C. De Keyser. Improved mould level control in a continuous steel casting line. In *Proceedings of the Conference of Automation in Mining, Metallurgy and Minerals Processing, 25-31 August, Sun City, South Africa*, pages 127–132. IFAC, 1995.

[40] M. Inkinen, P. Lautala, and E. Saarelainen. Fuzzy-guided mould level control in continuous steel casting. In *Proceedings of the Conference of Automation in Mining, Metallurgy and Minerals Processing, 25-31 August, Sun City, South Africa*, pages 133–138. IFAC, 1995.

[41] F. Kong and R. De Keyser. Identification and control of the mould level in a continuous casting machine. In *Proceedings of the Second IEEE Conference on Control Applications, 13-16 September*, pages 53–58, 1993.

[42] S.F. Graebe, G.C. Goodwin, and G. Elsley. Control design and implementation in continuous steel casting. *IEEE Control Systems Magazine*, pages 64–71, August 1995.

[43] M.S. Jenkins, B.G. Thomas, W.C. Chen, and R.B. Mahapatra. Investigation of strand surface defects using mold instrumentation and modelling. In *Steelmaking Conference Proceedings, Warrendale, USA*, pages 337–345, 1994.

[44] P. Nilles and C. Marique. Secondary steelmaking, a must for meeting steel consumers' demands. *Metallurgical Plant and Technology*, 12(5):72–88, 1989.

[45] P.-O. Mellberg. Automatic metal level and slag transfer control in continuous casting. In *Continuous Casting '85*, pages 55.1–55.6, London, 1985.

[46] T. Hesketh, D.J. Clements, and R. Williams. Adaptive mould level control for continuous casting slabs. *Automatica*, 29(4):851–864, 1993.

[47] M. Hattori, S. Nagata, A. Inaba, S. Ishitobi, T. Yamamoto, T. Okada, and M. Zeze. Development of technology to eliminate centerline segregation in continuously cast slabs. *Iron and Steelmaker*, 16(6):34–39, June 1989.

[48] P. Andrzejewski, K.-U. Köhler, and W. Pluschkell. Model investigations on the fluid flow in continuous casting moulds of wide dimensions. *Steel Research*, 63(6):242–246, 1992.

[49] T.J. Manayathara, T-C Tsao, J. Bentsman, and D. Ross. Rejection of unknown periodic load disturbances in continuous steel casting process using learning repetitive control approach. *IEEE Transactions on Control Systems Technology*, 4(3):259–265, May 1996.

[50] J.K. Brimacombe and I.V. Samarasekera. Fundamental analysis of the continuous casting process for quality improvements. In *Indo-U.S. Workshop on Materials Processing*, pages 179–222, 1988.

[51] M. Gagné and E. Thibault. Behaviour of inclusions during rolling of continuously cast billets. *CIM Bulletin*, 91(1021):98–103, June 1998.

[52] Y. Nuri, K. Umezawa, F. Nomura, and M. Nishida. Idenitifcation of Alumina-clusters and exogeneous inclusions from mold powder in CC slabs. *Transactions ISIJ*, 26(11): 955–962, 1986.

[53] J.K. Brimacombe and K. Sorimachi. Crack formation in the continuous casting of steel. *Metallurgical Transactions B*, 8:489–505, 1977.

[54] J.K. Brimacombe, E.B. Hawbolt, and F. Weinberg. Formation of off-corner internal cracks in continuously-cast billets. *Canadian Metallurgical Quarterly*, 19:215–227, 1980.

[55] J.K. Brimacombe, F. Weinberg, and E.B. Hawbolt. Formation of longitudinal, midface cracks in continuously-cast slabs. *Metallurgical Transactions B*, 10:279–292, 1979.

[56] M. El-Bealy. On the mechanism of halfwaycracks and macro-segregation in continuously cast steel slabs— (i). halfway cracks. *Scandinavian Journal of Metallurgy*, 24 (3):63–80, 1995.

[57] J.K. Brimacombe. Design of continuous casting machines based on a heat-flow analysis: State-of-the-art review. *Canadian Metallurgical Quarterly*, 15(2):163–175, 1976.

[58] M. El-Bealy. On the mechanism of halfwaycracks and macro-segregation in continuously cast steel slabs— (ii). macrosegregation. *Scandinavian Journal of Metallurgy*, 24(3):106–120, 1995.

[59] R.L. Newton, F.J. Leese, G. Maw, T. McHugh, J. Morris, G.K. Knotman, D. Vincent, and J.M. Young. *Definitions and Causes of Continuous Casting Defects*. The Iron and Steel Institute, Percy Lund, Humphreys and Co, London, 1967. Prepared by the Nomenclature of Continuous Casting Defects Group of the Steelmaking Division, British Iron and Steel Research Association.

[60] B. Mintz, S. Yue, and J.J. Jones. Hot ductility of steels and its relationship to the problem of transverse cracking during continuous casting. *International Materials Reviews*, 36(5):187–217, 1991.

[61] T.J.H. Billany, A.S. Normanton, K.C. Mills, and P. Grieveson. Surface cracking in continuously cast products. *Ironmaking and Steelmaking*, 18(6):403–410, 1991.

[62] K. Yasumoto, Y. Maehara, T. Nagamichi, and H. Tomono. Effect of thermo-mechanical history on surface cracking of As-cast low carbon low alloy steel slabs. *ISIJ International*, 29(11):933–939, 1989.

[63] A. Diener, A. Drastik, B. Redenz, and K. Wagner. Investigation of straightening process in circular-arc type slab caster and resulting stresses and strains in strand. In *Continuous Casting '85*, pages 69.1–69.6, London, 1985.

[64] K. Harste and K.-H. Tacke. Slab caster design criteria for high quality steel. In *Ironmaking conference proceedings, April, Chicago, USA*, pages 743–752, 1997.

[65] E.S. Szekeres. Overview of mold oscillation in continuous casting. *Iron and Steel Engineer*, 73(7):29–37, July 1996.

[66] E. Takeuchi and J.K. Brimacombe. Effect of oscillation mark formation on the surface quality of continuously cast steel slabs. *Metallurgical Transactions B*, 16B(3):605–625, September 1985.

[67] M.M. Wolf. Mold oscillation guidelines. In *Steelmaking Conference Proceedings, Washington, USA*, pages 51–71, 1991.

[68] J.L. Muller. Détection des défauts de surface sur les demi-produits chauds par courants de Foucault. *Revue de Métallurgie-CIT*, 84(6):483–486, June 1987.

[69] H. Hiebler. *Gmelin-Durrer, Metallurgy of Iron*, volume 11a, Practice of Steelmaking 5: Continuous casting. Springer-Verlag, Berlin, 1992.

[70] R.J. Gray, A. Perkins, and B. Walker. Quality of continuously cast slabs. In *Solidification and Casting of Metals, Proceedings of an International Conference on Solidification, 18-21 July*, pages 300–305. The Metals Society, 1977.

[71] W.H. Emling. Breakout prevention. *Iron and Steelmaker*, 21(7):47–48, July 1994.

[72] B. Mintz. The influence of composition on the hot ductility of steels and to the problem of transverse cracking. *ISIJ International*, 39(9):833–855, 1999.

[73] M.H. Burden, G.D. Funnell, A.G. Whitaker, and J.M. Young. Origins of defects in continuously cast blooms produced on a curved mould machine. In *Solidification and Casting of Metals, Proceedings of an International Conference on Solidification, 18-21 July*, pages 279–286. The Metals Society, 1977.

[74] K.D. Unger, W. Biesterfeld, F. Berentzen, and R. Thielmann. Metallurgical problems encountered in stainless steel continuous casting. In *Continuous Casting '85*, pages 61.1–61.7, London, 1985.

[75] S.D. Razumov, V.V. Zabil'skii, V.I. Umanets, V.I. Lebedev, and V.A. Obukhov. Influence of chemical composition of steel on quality of continuously cast billet. *Steel in the USSR*, 16(5):225–228, May 1986.

[76] T. Saito, M. Kimura, H. Ueta, T. Kimura, K. Takemoto, and T. Mine. Prevention of surface crack formation in continuous cast slab. *Kobelco Technology Review*, (11): 54–57, June 1991.

[77] J. Leclerc and W. Pollak. Continuous cast slab defects related to final product quality and associated operating precautions. In *Continuous casting of steel. Proceedings of an international conference*, pages 125–134. The Metals Society, 1977.

[78] N.S. Hunter, J.D. Madill, D.J. Scoones, P.N. Hewitt, and D. Stewart. Progress in mould thermal monitoring. *Steel Technology International*, pages 171–174, 1996.

[79] D.E. Humphreys, J.D. Madill, V. Ludlow, D. Stewart, S.G. Thornton, and A.S. Normanton. Application of mould thermal monitoring in the study of slab surface quality for heavy plate grades at Scunthorpe works, British Steel. In *1st European Conference on Continuous Casting, September, Florence, Italy*, pages 1.529–1.540, September 1991.

[80] K. Nakajima, S. Hiraki, M. Kawamoto, and T. Kanazawa. Influence of mold heat flux on longitudinal surface cracks during high-speed continuous casting of steel slab. *The Sumitomo Search*, (55):32–39, May 1994.

[81] S.L. Kang, I. J. Lee, S.D. Shin, S.M. Yang, H.B. Lee, J. Choi, and I.R. Lee. Optimization of casting conditions by the measurement of mold wall temperature at Pohang Works. In *77th Steelmaking Conference Proceedings, Warrendale*, volume 77, pages 347–356, 1994.

[82] K.-H. Kim, T.-J. Yeo, K.H. Oh, and D.N. Lee. Effect of carbon and sulfur in continuously cast strand on longitudinal surface cracks. *ISIJ International*, 36(3):284–289, 1996.

[83] B.P. Moiseev, V.S. Esaulov, V.A. Nikolaev, V.V. Emel'yanov, and N.I. Gubin. Nature of longitudinal surface cracks in continuously cast slabs. *Steel in the USSR*, 16(12): 590–593, December 1986.

[84] R.A. Heard and A. McLean. Quality of hcc products. In R.A. Heard and A. McLean, editors, *Continuous casting*, volume Five, Horizontal Continuous Casting, chapter 3, pages 87–95. The Iron and Steel Society, 1988.

[85] T.W. Clyne and G.J. Davies. Comparison between experimental data and theoretical predictions relating to dependence of solidification cracking on composition. In *Solidification and Casting of Metals, Proceedings of an International Conference on Solidification, 18-21 July*, pages 275–278. The Metals Society, 1977.

[86] Ya.N. Malinochka, L.A. Moiseeva, T.V. Esaulova, V.S. Esaulov, and Yu.S. Shmelev. Some defects in continuously cast slabs and improving steel quality. *Steel in the USSR*, 17(10):448–451, October 1987.

[87] M. Kawamoto, Y. Tsukaguchi, N. Nishida, T. Kanazawa, and S. Hiraki. Improvement of the initial stage of solidification by using mild cooling mold powder. *ISIJ International*, 37(2):134–139, 1997.

[88] W.R. Irving and A. Perkins. Basic parameters affecting the quality of continuously cast slabs. In *Continuous casting of steel. Proceedings of an international conference, Biarritz, France 31 May–2 June*, pages 107–115. The Metals Society, 1977.

[89] N.A. McPherson and S.L. McIntosh. Mold powder related defects in some continuously cast steel products. *Iron and Steelmaker*, 14(6):19–25, June 1987.

[90] A.W. Cramb and I. Jimbo. Interfacial considerations in continuous casting. *Iron and Steelmaker*, 16(6):43–55, June 1989.

[91] R.B. Mahapatra, J.K. Brimacombe, and I.V. Smarasekera. Mold behaviour and its influence on quality in the continuous casting of steel slabs: Part 2. mold heat transfer, mold flux behavior, formation of oscillation marks, longitudinal off-corner depressions, and subsurface cracks. *Metallurgical Transactions B*, 22B(6):875–888, December 1991.

[92] K.C. Mills, P. Grieveson, A. Olusanya, and S. Bagha. Effect of casting powder on heat transfer in continuous casting. In *Continuous Casting '85*, pages 57.1–57.7, London, 1985.

[93] K.C. Mills. The performance of casting powders and their effect on surface quality. In *Steelmaking Conference Proceedings, Washington, USA*, pages 121–129, 1991.

[94] R.W. Soares, M.V.A. Fonseca, R. Neuman, V.J. Menezes, A.O. Lavinas, and J. Dweck. An application of differential thermal analysis to determine the change

in thermal properties of mold powders used in continuous casting of steel slabs. *Thermochimica Acta*, 318(1-2):131–136, 1998.

[95] J. Savage and W.H. Pritchard. The problem of rupture of the billet in the continuous casting of steel. *Journal of the Iron and Steel Institute*, 178:269–277, November 1954.

[96] K.E. Blazek and I.G. Saucedo. Characterization of the formation, propagation, and recovery of sticker/hanger type breakouts. *ISIJ International*, 30(6):435–443, 1990.

[97] K.C. Mills, T.J.H. Billany, A.S. Normanton, B. Walker, and P. Grieveson. Causes of sticker breakout during continuous casting. *Ironmaking and Steelmaking*, 18(4): 253–265, 1991.

[98] K.E. Blazek and I.G. Saucedo. Recovery of sticker-type breakouts. *Iron and Steelmaker*, pages 28–36, November 1989.

[99] S. Kumar, B.N. Walker, I.V. Samarasekera, and J.K. Brimacombe. Chaos at the meniscus - the genesis of defects in continuously cast steel billets. In *13th PTD Conference Proceedings, Nashville, USA*, pages 119–141, 1995.

[100] M. Bobadilla, J.M. Jolivet, J.Y. Lamant, and M. Larrecq. Continuous casting of steel: a close connection between solidification studies and industrial process development. *Materials Science and Engineering A*, A173(1-2):275–285, 1993.

[101] J.L. Brendzy, I.A. Bakshi, I.V. Samarasekera, and J.K. Brimacombe. Mould–strand interaction in continuous casting of steel billets part II lubrication and oscillation mark formation. *Ironmaking and Steelmaking*, 20(1):63–75, 1993.

[102] M. Suzuki, H. Mizukami, T. Kitagawa, K. Kawakami, S. Uchida, and Y. Komatsu. Development of a new mold oscillation mode for high speed continuous casting of steel slabs. *ISIJ International*, 31(3):254–261, 1991.

[103] B. Lindorfer, H. Hödl, and K. Mörwald. Technological packages for high performance slab casting. *MPT International*, 22(1):66–68, 1998.

[104] R.B. Mahapatra, J.K. Brimacombe, and I.V. Samarasekera. The influence of mould design and operation on oscillation-mark formation, heat transfer and quality in the continuous casting of steel slabs. *La metallurgia italiana*, 83(12):1105–1112, 1991.

[105] M.J. Hague and D. Parlington. Diagnostic aids for quality improvement and maintenance in continuous casters. *Iron and Steel Engineer*, 65(5):36–42, May 1988.

[106] AEC. Glossary of terms. Web site, 2003. Aluminium Extruders Council, http://www.aec.org/resources/cyber_gloss7.html, last visited on 30 January 2003.

[107] S. Chandra, J.K. Brimacombe, and I.V. Samarasekera. Mould-strand interaction in continuous casting of steel billets. part 3 mould heat transfer and taper. *Ironmaking and Steelmaking*, 20(2):104–112, 1993.

[108] A. Spaccarotella, R. Moretti, G. Di Schino, and G. Provantini. Influence of mould oscillation and powder lubrication on surface quality of austenitic stainless steel slabs at Terni Works. In *Continuous Casting '85*, pages 42.1–42.11, London, 1985.

[109] M.M. Wolf. Mold length in slab casting – a review. *Iron and Steelmaker*, 23(2):47–51, February 1996.

[110] M. Wolf. Strand surface quality of austenitic stainless steels: Part 1 macroscopic shell growth and ferrite distribution. *Ironmaking and Steelmaking*, 13(5):248–257, 1986.

[111] M. Wolf. Strand surface quality of austenitic stainless steels: Part 2 microscopic solidification structure. *Ironmaking and Steelmaking*, 13(5):258–262, 1986.

[112] M.R. Ozgu. Continuous caster instrumentation: state-of-the-art review. *Canadian Metallurgical Quarterly*, 35(3):199–223, 1996.

[113] M.I. Chipalo, M.D. Gilchrist, and R.A. Smith. A finite element technique for the investigation of the shape development of planar cracks with initially irregular profiles. *International Journal of Mechanical Sciences*, 32(3):243–251, 1990.

[114] M.D. Gilchrist and R.A. Smith. Finite element modelling of fatigue crack shapes. *Fatigue and Fracture of Engineering Materials & Structures*, 14(6):617–626, 1991.

[115] H. Kametani. Fractal analysis of the surface cracks on continuously cast steel slabs. *Metallurgical and Materials Transactions B*, 29B(6):1261–1267, December 1998.

[116] M. De Santis and A. Ferretti. Thermo-fluid-dynamics modelling of the solidification process and behaviour of non-metallic inclusions in the continuous casting slabs. *ISIJ International*, 36(6):673–680, 1996.

[117] D. Bouris and G. Bergeles. Investigation of inclusion re-entainment from the steel-slag interface. *Metallurgical and Materials Transactions B*, 29B(3):641–649, 1998.

[118] I. Sawada, E. Takeuchi, H. Tanaka, K. Okazawa, and K. Shigematsu. Development and application of simulator for analyzing molten steel flow and inclusion behavior in continuous casters. Technical Report 67, Nippon Steel, October 1995. pp.7–12.

[119] W. Yamada, S. Fukumoto, H. Tanaka, T. Matsumiya, and M. Wajima. Development and application of computer simulation techniques for analyzing composition, particle size distribution, and amount of nonmetallic inclusions in steel. Technical Report 67, Nippon Steel, October 1995. pp. 21–28.

[120] R.M. McDavid and B.G. Thomas. Flow and thermal behavior of the top surface flux/powder layers in continuous casting molds. *Metallurgical and Materials Transactions B*, 27B(4):672–685, August 1996.

[121] C. Bailey, P. Chow, M. Cross, Y. Fryer, and K. Pericleous. Multiphysics modelling of the metals casting process. *Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences*, 452:459–486, 1996.

[122] B.R. Henriksen, E.K. Jensen, and D. Mortensen. Interpretation of measured temperatures and the bleed out phenomenon of billet casting applying the mathematical model alsim. In *Light Metals 1999*, pages 721–727. The Minerals, Metals and Materials Society, 1999.

[123] J.R. King, A.A. Lacey, C.P. Please, P. Willmott, and A. Zoryk. The formation of oscillation marks on continuously cast steel. *Mathematical Engineering in Industry*, 4(2):91–106, 1993.

[124] H. Sha, R. Diedrichs, and K. Schwerdtfeger. Dynamic behavior of a liquid/liquid interface at an oscillating wall. *Metallurgical and Materials Transactions B*, 27B(2): 305–314, April 1996.

[125] B.G. Thomas, A. Moitra, and H. Zhu. Coupled thermo-mechanical model of solidifying steel shell applied to depression defects in continuous-cast slabs. In M. Cross and J. Campbell, editors, *Modelling of Casting, Welding and Advanced Solidification Processes VII, September, London*, pages 241–248, 1995.

[126] B.G. Thomas, A. Moitra, and R. McDavid. Simulation of longitudinal off-corner depressions in continuously cast steel slabs. *Iron and Steelmaker*, pages 57–70, April 1996.

[127] B.G. Thomas, D. Lui, and B. Ho. Effect of transverse depressions and oscillation marks on heat transfer in the continuous casting mold. In *Proceedings of a Symposium on the Application of Sensors and Modeling to Materials Processing, 9–13 February, Orlando, USA*, pages 117–142, 1997.

[128] P. Gugliermina, Y. Codur, and J.M. Cardouat. Tapping good steel on time. *Ironmaking and Steelmaking*, 14(2):79–83, 1987.

[129] W. R. Irving. On line quality control for continuously cast semis. *Ironmaking and Steelmaking*, 17(3):197–202, 1990.

[130] M.W. Short, B. Barber, A.S. Normanton, B. Patrick, and R.A. York. Temperature prediction and control during continuous casting. In *Ironmaking Conference Proceedings, 13–16 April, Chicago, USA*, pages 655–659, 1997.

[131] S.E. Royzman. Coefficient of friction between strand and mould during continuous casting: mathematical model. *Ironmaking and Steelmaking*, 24(6):484–488, 1997.

[132] R.J. O'Malley. Observations of various steady state and dynamic thermal behaviors in a continuous casting mold. In *Steelmaking Conference Proceedings, 26-29 March, Pittsburgh, USA*, pages 13–32, 1999.

[133] T. Matsumiya, T. Ohashi, and Y. Abe. Mathematical analysis on thermal and unbending deformation of continuously cast slabs. In *Modeling and Control of Casting and Welding Processes, 12-17 January, Santa Barbara, USA*, pages 523–538. AIME, 1986.

[134] B.Q. Li and Y. Ruan. Integrated finite element model for transient fluid flow and thermal stresses during continuous casting. *Journal of Thermal Stresses*, 18:359–381, 1995.

[135] J.Y. Lamant, M. Larrecq, J.P. Birat, J.L. Hensgen, J.D. Weber, and J.C. Dhuyvetter. Study of slab bulging in continuous caster. In *Continuous Casting '85*, pages 37.1–37.8, London, 1985.

[136] K. Harste, M. Deisinger, I. Steinert, and K. Tacke. Thermische und mechanische Modelle zum Stranggießen. *Stahl und Eisen*, 115(4):111–118, 1995.

[137] S.K. Das and A. Sarkar. Computational modelling of thermal transport phenomena in continuous casting process based on non-orthogonal control volume approach. *Communications in Numerical Methods in Engineering*, 12(10):657–671, 1996.

[138] D.A. Breslin, A. Hetherington, and P.N. Walker. Continuous casting excellence by design. *Metallurgical Plant and Technology International*, 22(3):68–77, 1999.

[139] R.B. D'Agostino and M.A. Stephens. *Goodness-Of-Fit Techniques*. Marcel-Dekker, New York, 1986.

[140] R.A. Johnson. *Miller and Freund's Probability and Statistics for Engineers*. Prentice Hall, Englewood Cliffs, 1994.

[141] F.J. Massey Jr. The Kolmogorov-Smirnov test for goodness of fit. *Journal of the American Statistical Association*, 46(253–256):68–78, 1951.

[142] T.W. Anderson and D.A. Darling. Asymptotic theory of certain "goodness-of-fit" criteria based on stochastic processes. *The Annals of Mathematical Statistics*, 23: 193–212, 1952.

[143] H. Peters, N. Link, and T. Heckenthaler. Application of data mining techniques to find correlation between quality data and process variables. In *Preprints of the 10th IFAC Symposium on Automation in Mining, Mineral and Metal Processing (MMM2001), 4-6 September, Tokyo, Japan*, pages 141–146, 2001.

[144] D.C. Montgomery, G.C. Runger, and N.F. Hubele. *Engineering Statistics*. John Wiley & Sons, New York, 2nd edition, 2001.

[145] J. Ikäheimonen, K. Leiviskä, J. Russka, and J. Matkala. Nozzle clogging prediction in continuous casting of steel. In *Preprints of the 15th IFAC World Congress, Barcelona, Spain, 21-26 July*, 2002. Paper T-Th-E12 02.

[146] L. Ljung. *System Identification—Theory for the User*. Prentice Hall, Englewood Cliffs, 1987.

[147] L. Ljung. *System Identification Toolbox for use with MATLAB®*. The MathWorks Inc, Natick, 1995.

[148] F.L. Lewis. Optimal control. In W.S. Levine, editor, *The Control Handbook*, chapter 48, pages 759–778. CRC Press, IEEE Press, Boca Raton, 1996.

[149] N. S. Nise. *Control Systems Engineering*. John Wiley & Sons, New York, 3rd edition, 2000.

[150] K. Fisher and R.M. Mesic. Design and development of Dofasco's quality information database. *Iron and Steel Engineer*, 66(10):22–28, October 1989.

[151] M. Mayos, J.M. Turon, P. Alexandre, J.L. Salon, M. Depeyris, and J.C. Rios. Non destructive on-line inspection of the whole surface of continuously cast slabs. *La Revue de Métallurgie-CIT*, 90(6):824–828, June 1993.

[152] T.J. Knox. Measurement and analysis – a basis for steel quality and customer confidence. *Ironmaking and Steelmaking*, 18(3):196–200, 1991.

[153] D. Foster. Surface inspection of continuously cast slabs. *Metals and Materials*, 7(5): 291–298, May 1991.

[154] R. Brockhoff, F. Hücking, E. Wagener, and W. Reichelt. In-line quality determination of continuously cast material. In *Continuous Casting '85*, pages 60.1–60.10, London, 1985.

[155] D.E. Seborg, T.F. Edgar, and D.A. Mellichamp. *Process dynamics and control*. Wiley Series in Chemical Engineering. John WIley & Sons, New York, 1989.

[156] R.S. Bogartz. *An introduction to the analysis of variance*. Praeger, Westport, 1994.

[157] G. Keppel. *Design and Analysis—A researcher's handbook*. Prentice Hall, Englewood Cliffs, 3rd edition, 1991.

[158] R. Christensen. *Analysis of Variance, Design and Regression—Applied Statistical Methods*. Chapman & Hall, London, 1996.

[159] H. Pinger. Computer aided quality control in an integrated steelworks. *Steel Times*, 217(10):559,563, October 1989.

[160] R.B. Mahapatra, J.K. Brimacombe, I.V. Samarasekera, N. Walker, E.A. Paterson, and J.D. Young. Mold behaviour and its influence on quality in the continuous casting of steel slabs: Part 1. industrial trials, mold temperature measurements, and mathematical modeling. *Metallurgical Transactions B*, 22B(6):861–873, December 1991.

[161] J.R. Boyle, J.A. Penrice, and T. Reynolds. Machine design for maximising quality, throughput and availability. In *Continuous Casting '85*, pages 62.1–62.10, London, 1985.

[162] M. Langer and H. Moll. Process automation and modelling for consistent quality. *Steel Times International*, 14(2):40 & 42, March 1990.

[163] B. Lally, L.T. Biegler, and H. Henein. Optimization and continuous casting: Part i. problem formulation and solution strategy. *Metallurgical Transactions B*, 22B(5): 641–648, 1991.

[164] B. Lally, L.T. Biegler, and H. Henein. Optimization and continuous casting: Part ii. application to industrial casters. *Metallurgical Transactions B*, 22B(5):649–659, 1991.

[165] A.F. Mills. *Heat Transfer*. Irwin, International Student Edition edition, 1992.

[166] S. Barozzi, P. Fontana, and P. Pragliola. Computer control and optimization of secondary cooling during continuous casting. *Iron and Steel Engineer*, 63(11):21–25, November 1986.

[167] K. Furuta, A. Sano, and D. Atherton. *State Variable Methods in Automatic Control*. John Wiley & Sons, Chichester, 1988.

[168] A. Grace, A.J. Laub, J.N. Little, and C.M. Thompson. *Control System Toolbox for use with MATLAB®*. The MathWorks Inc, Natick, 1992.

[169] G.C. Goodwin, S.F. Graebe, and M.E. Salgado. *Control System Design*. Prentice Hall, Upper Saddle River, 2001.

[170] F.L. Lewis. *Optimal Control*. Wiley, New York, 1986.

[171] Z. Sun, S.S. Ge, and T.H. Lee. Controllability and reachability criteria for switched linear systems. *Automatica*, 38(5):775–786, 2002.

[172] J. Zhao and M.W. Spong. Hybrid control for global stabilization of the cart-pendulum system. *Automatica*, 37(12):1941–1951, 2001.

[173] A. Kordona, P. S. Dhurjatia, Y. O. Fuentesb, and B. A. Ogunnaikeb. An intelligent parallel control system structure for plants with multiple operating regimes. *Journal of Process Control*, 9(5):453–460, October 1999.

[174] R.H. Middleton, S.F. Graebe, A. Ahlén, and J.S. Shamma. Design methods. In W.S. Levine, editor, *The Control Handbook*, chapter 20, pages 377–396. CRC Press, IEEE Press, Boca Raton, 1996. See §20.2.

[175] Mathworks. *Simulink®—Dynamic System Simulation Software—User's guide*. The Mathworks Inc, Natick, 1992.