



PROCESS CONTROL GROUP

PUBLICATIONS TO DATE - Mar. 29th, 2010

1. **Hyde, A., Salomon de Friedberg, A., and Coleman, M.** *Control of Fugitive Emissions in a Continuous Mitsubishi C-Furnace during Limestone Fluxing*, proceedings of Cu 2010 – Copper – Indicator of the progress of civilization, Hamburg, Germany – to be presented – June 6-10, 2010.
2. **Bouchard, J., Émond, M., Monnapula, R., and Molelekeng, N.** *Asset Optimisation Through Process Control at Xstrata Alloys – Eland Platinum – “Optimal Doesn’t Always Rhyme with Capital”*, proc. 42nd Canadian Mineral Processors, Ottawa, January 2010, Paper No. 26, pp. 419-438.
3. **Desbiens, A., del Villar, R., Maldonado, M., (Laval University); and Bouchard, J.,** *Towards the optimization of flotation column operation*, 48th Conference of Metallurgists (COM2009), held in conjunction with Nickel & Cobalt 2009, Sudbury, 23 - 26 Aug. 2009.
4. **Shang, H., (Laurentian University), Nelson, P., and Salt, B.,** *Integrated Modelling of a Smelter Off-gas Cleaning System*, 48th Conference of Metallurgists (COM2009), held in conjunction with Nickel & Cobalt 2009, Sudbury, 23 - 26 Aug. 2009.
5. **Bouchard, J., Émond, M.,** *Who you gonna call? The difference between process control, instrumentation and control systems expertise*, CIM Magazine upfront TECHNOLOGY, August 2009, Vol.4 – No.5, pages 24 and 25.
6. **Núñez, E., MacPherson, G., Graffi, D., and Tuzun, A.,** *Self-optimizing Grinding Control for Maximizing Throughput while Maintaining Cyclone Overflow Specifications*, 41st Annual CMP (Canadian Mineral Processors) Conference 2009, Ottawa, Jan. 19-22, 2009, Paper 32, pp. 541-555.
7. **Bartsch, E., Comeau, G., and Hardie, C.,** *Evolution of SAG Mill Process Control at the Xstrata Nickel Raglan Operation*, CIM Magazine Executive Summaries, November 2008, page 102.
8. **Bouchard, J., Desbiens, A., del Villar, R., and Núñez, E.,** *Column Flotation modeling and Control: A Review*, Submitted to Minerals Engineering, 6th July 2008.
9. **Bartsch, E., Comeau, G., and Hardie, C.,** *Evolution of SAG Mill Process Control at the Xstrata Nickel Raglan Operation*, 40th Annual CMP (Canadian Mineral Processors) 2008, Ottawa, Jan. 22-24, 2008, pp 445-464.
10. **Shang, H., Dillabough, M., Nelson, P., and Salt, B.,** *Dynamic Modelling of an Industrial Smelter Furnace and Converter Off-gas System*, American Journal of Environmental Sciences, vol. 4, number 1, 22-30, 2008.
11. **Desbiens, A., Núñez, E., del Villar, R., Hodouin, D., and Poulin, E.,** *Using Process Control to Increase the Energy Efficiency of Mineral Processing Plants*, International Journal of Power and Energy Systems, Vol. 28, No. 2, 2008, pp 145-152.
12. **Salomon de Friedberg, A., (Hyde, A.),** *Continuous C-Furnace Limestone Injection at the Kidd Smelter*, 10th Mitsubishi Family Meeting, Timmins, October 2007.
13. **Nelson, P., Hyde, A., McEwan, M., and Sandoz, D.,** *Integrity Monitoring of Xstrata Copper’s Kidd Metallurgical Division Mitsubishi 3-Line Furnaces Using Multivariate Methods*, 6th Copper Conference – Cu2007, Toronto, August 2007, Volume VII Process Control, Optimization, and Six Sigma, pp 229-239.
14. **Kreuh, M., Wraith, A.E., McEwan, M., and Lind, P.,** *Tuyere Pressure Frequency Measurements in a Pierce Smith Converter*, 6th Copper Conference – Cu 2007, Toronto,



- August 2007, Volume VII Process Control, Optimization, and Six Sigma, pp 159-175.
15. **Romero, F., Avila, G., Fester, R., and Yacher, L.,** *Using Multivariable Analysis for Cathode Quality Improvement in C. M. Doña Inés de Collahuasi EW Plant.* 6th Copper Conference – Cu2007, Toronto, Canada, August 2007.
 16. **Thwaites, P.E.,** *Process Control in metallurgical plants–From an Xstrata perspective, Plenary (Industrial) Lecture (P3), 12th IFAC Symposium on Automation in Mining, Mineral and Metal Processing – IFAC MMM '07,* Quebec City, August 2007, Elsevier, Annual Reviews in Control 31 (2007), pp 221-239.
 17. **Fanas, J., Tiburcio, P., Restituyo, W., Lovett, D., McEwan, M., Sandoz, D., and Ryan, L.A.,** *Automatic Control Development for the Falcondo Ferronickel Electric Arc Smelting Furnaces, 12th IFAC Symposium on Automation in Mining, Mineral and Metal Processing – IFAC MMM'07,* Quebec City, August 2007, Symposium Preprints, pp 65-70.
 18. **Shang, H., Thwaites, P.E., Ryan, L.A., and Nelson, P.,** *Comparison of Different Control Methods for an Industrial Nickel Smelter Roaster Off-Gas System, 12th IFAC Symposium on Automation in Mining, Mineral and Metal Processing – IFAC MMM '07,* Quebec City, August 2007, Symposium Preprints, pp 223-228.
 19. **Thwaites, P.E.,** *Process Control in Metallurgical Plants – from an Xstrata Perspective, Plenary (Industrial) Lecture (P3), 12th IFAC Symposium on Automation in Mining, Mineral and Metal Processing – IFAC MMM'07,* Quebec City, August 2007, Symposium Preprints, pp 375-389.
 20. **Núñez, E., Chirinos, J., del Villar, R., Desbiens, A., and Duchesne, C.,** *Predictive Control of Froth Depth and Air Hold-Up in a Pilot Flotation Column,* International Symposium on Application of Computers and Operations Research in the Mineral Industry (APCOM) 2007, Santiago, Chile, pp. 517-524, 2007.
 21. **Romero, F.,** *Automation, Information & Communication Technologies: Challenges and Opportunities for the Mineral Industry. Collahuasi's Case.* Plenary Lecture on 33rd International Symposium on Applications of Computers and Operations Research in the Mineral Industry – APCOM 2007, Santiago, Chile, April 24-27, 2007.
 22. **King, M.,** *The Evolution of Technology for Extractive Metallurgy over the Last 50 Years – Is the Best Yet to Come?,* JOM publication, February 2007.
 23. **Fester, R., Romero, F., and Acuña, P.,** *Control de Neblina Ácida y Ruido en Nave EW C. M. Doña Inés de Collahuasi.* I International Workshop on Process Hydrometallurgy – Hydroprocess 2006, Iquique, Chile, October 11-13, 2006.
 24. **Bouchard, J., Desbiens, A., del Villar, R., and Chirinos, J.,** *Column Flotation simulation: A Dynamic Framework,* International Conference on Mineral Process Modelling, Simulation and Control – MPMSC 2006, Sudbury, Canada, pp. 259-275, 2006.
 25. **Hanna, J., Upreti, S.R., Lohi, A., and Ein-Mozaffari, F.,** *Minimum Variance Tuning of PI Controllers Using Hybrid Genetic Algorithms,* Mineral Process Modelling, Simulation and Control – MPMSC 2006, Laurentian University, Sudbury, June 2006.
 26. **Nunez, E., Chirinos, J., Desbiens, A., del Villar, R., and Duchesne, C.,** *Multivariable Predictive Control of a Pilot Flotation Column. Part 1: On-Line Sensors for Froth Depth and Air Hold-Up,* International Conference on Mineral Process Modelling, Simulation and Control, Sudbury, Canada, pp. 277-290, 2006.
 27. **Núñez, E., Desbiens, A., del Villar, R., and Duchesne, C.,** *Multivariable Predictive Control of a Pilot Flotation Column. Part 2: Identification and Control,* International Conference on Mineral Process Modelling, Simulation and Control, Sudbury, Canada, pp. 291-301, 2006.
 28. **Nelson, P.R.C., MacGregor, J.F., and Taylor, P.A.,** *The impact of missing measurements on PCA and PLS prediction and monitoring applications,* Chemometrics and Intelligent



- Laboratory Systems, v. 80, n. 1, 1-12, 2006.
29. **Bouchard, J., Desbiens, A., and del Villar, R.,** *Optimization-free constrained nonlinear predictive control: Mineral processing applications*, 16th IFAC world congress, Prague, We-A22-T0/1, 2005.
 30. **Bouchard, J., Desbiens, A., and del Villar, R.,** *Recent advances in bias and froth depth control in flotation columns*, Minerals Engineering 18, pp. 709-720, 2005.
 31. **Nuñez, E.,** *Instrumentation et commande predictive d'une colonne pilote de flottation*, M.Sc. Thesis, Université Laval, Quebec, Canada, 2005.
 32. **Bouchard, J.,** *Commande automatique de la flottation en colonne : asservissement de la profondeur d'écume et du différentiel d'eau*, M.Sc. Thesis, Université Laval, Québec, 2004.
 33. **Desbiens, A., and Bouchard, J.,** *Constrained Nonlinear Predictive Control Based on IMC-Optimization*, 11th International Federation of Automatic Control (IFAC) Symposium on Automation in Mining, Mineral and Metal Processing, Nancy, France, Thu-C1, 2004.
 34. **Nuñez, E.,** *Stratégie de contrôle du circuit de broyage au concentrateur Toquepala au Pérou*, Presented at the Annual Conference of the Canadian Mineral Processor's Northwest Quebec Section, Rouyn-Noranda, Quebec, Canada, September 2004.
 35. **Ryan, L.A., Frias, J., Rodriguez, P., Morrow, A., Boland, M., and Sandoz, D.,** *Falconbridge Dominicana Reduction Shaft Furnace Advanced Control Development*, TMS 2004, Charlotte, NC, March 2004.
 36. **Romero, F., Suarez, M., and Bascur, O.A.,** *Improving metallurgical performance at Collahuasi*. 2004 SME Annual Meeting. Denver, CO, USA.
 37. **Romero, F., Orchard, M., and Yacher, L.,** *Statistical multivariate analysis for improved plant control at C.M. Dona Ines de Collahuasi SCM, Chile*. 2003 SME Annual Meeting, Cincinnati, OH, USA.
 38. **Romero, F.,** *Herramientas de Optimización en Molienda*. Taller de Procesamiento de Minerales 2002, Antofagasta, Chile, October 23-25, 2002.
 39. **Núñez, E.,** *Filosofía de control para molienda y clasificación en la planta concentradora de Toquepala y diseño de una estrategia de control utilizando DCS*, Thesis, Universidad Católica de Santa María, Arequipa, Peru, 2002.
 40. **Suichies, M., Leroux, D., Dechert, C., and Trusiak, A.,** *Model Predictive Control of the Flotation Process*, CMP, Ottawa, On., Canada, January 1999.
 41. **Ryan, L.A., Flament, F., and Desbiens, A.,** *Kidd Creek Mines Automatic Primary Grinding Control*, CMP, Ottawa, On., Canada, January 1996.
 42. **Thwaites, P.E.,** *Computer Controlled Reagent Addition Strategy and Hardware For The Control OF A Copper And Zinc Flotation Process – Third Meeting of the Canadian Industrial Computer Society*, May 1986, Montreal, Canada, pp 56-58.
 43. **Thwaites, P.E.,** *Continued development of copper flotation control at the Kidd Creek concentrator*, CIM Bulletin, December 1983, pp. 41-46.
 44. **Thwaites, P.E.,** *Continued development of copper flotation control at the Kidd Creek concentrator*, 15th Annual Meeting of the Canadian Mineral Processors (CMP) Division of CIM, Held at the Canada Centre for Mineral and Energy Technology, Energy, Mines and Resources Canada, Ottawa, Jan. 18-20, 1983, Paper 20, pp. 287-316.

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