

EXMENTE

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JOHAN ZIETSMAN

Professional Profile

1 OVERVIEW

Johan Zietsman completed his bachelor's degree in metallurgical engineering at the University of Pretoria in 1993. As the best final-year student in mining, metallurgical and chemical engineering, he received the Chamber of Mines Scholarship, which he used to fund six months of his master's degree study with Professors Keith Brimacombe and Indira Samarasekera at the University of British Columbia. He completed the degree in 1996 at the University of Pretoria and went on to complete his Ph.D in 2004. He worked at Iscor Heavy Minerals from 1995 to 1999 and at Crusader Systems from 1999 to 2000. From 2000 to 2001 he was an independent consultant, and in October 2001 he co-founded the process engineering consulting and systems company Ex Mente, where he is currently managing director.

2 PROFILE SUMMARY

Personal Information & Education		
Full names:	Johannes Hendrik Zietsman	
Date of birth:	28 January 1971	
Professional Affiliations	Pr. Eng. (ECSA); Member (SAIMM)	
Qualifications:	B.Eng; M.Eng; Ph.D. (all metallurgical engineering)	
Institution:	University of Pretoria	
Dates awarded:	1993, 1996, 2004	
Focus of academic work:	Modelling of pyrometallurgical processes.	
Work History		
Period	Employer	Position
1991/01 - 1991/12	Iscor Vanderbijlpark Works	Engineering Student
1993/12 - 1994/08	Iscor Pretoria Works	Engineer In Training
1994/09 - 1995/07	University of British Columbia	Visiting Student
1995/03 - 1995/07	Iscor R&D	Engineer in Training
1995/08 - 1999/07	Iscor Heavy Minerals	Process Engineer
1999/08 - 2000/07	Crusader Systems	Project Manager and Lead Process Engineer
2000/08 - 2001/09	White Peak Consulting CC	Sole Member and Consultant
2001/10 - present	Ex Mente (Pty) Ltd	Managing Director and Process Engineer
Interests		
Process Engineering	Software Development	Information Systems
Analysis of processes and process-related problems.	Design and development of process modelling software. Less focused on actual software coding, and more on design and specification.	Analysis, design and development of information systems applied to the plant/process environment.
Modelling and simulation of metallurgical and chemical processes in general, and focusing on pyrometallurgical applications.		Integration of all types of data into process-level systems to enhance the usefulness of such data, and the abilities of on-line systems.
Development and implementation of advanced process control systems for chemical and metallurgical processes.		

3 PERSONAL INFORMATION

Full names:	Johannes Hendrik Zietsman
Date of birth:	28 January 1971

4 PROFESSIONAL AFFILIATIONS

ECSA	Registered Professional Engineer
SAIMM	Member

5 QUALIFICATIONS

Qualification	Bachelor of Engineering (Metallurgical) Cum Laude
Institution	University of Pretoria
Date awarded	1993
Subject of final year project	Scrap melting in an electric arc furnace
Notes:	Received the Chamber Of Mines bursary for the best final year student in mining, metallurgical and chemical engineering.

Qualification	Master of Engineering (Metallurgical) Cum Laude
Institution	University of Pretoria
Date awarded	1996
Subject of thesis	The application of artificial neural networks to the continuous casting of steel billets.
Supervisor	Prof P.C. Pistorius

Qualification	Ph.D. (Metallurgical Engineering)
Institution	University of Pretoria
Date awarded	2004
Subject of dissertation	Interactions between freeze lining and slag bath in ilmenite smelting.
Supervisor	Prof P.C. Pistorius

6 WORK HISTORY**6.1 Undergraduate Experience**

Employer	Iscor Vanderbijlpark Works
Period	1991/01 - 1991/12
Department	Electric Arc Furnaces
Supervisor	Mr Flip Schutte (Process Engineer)
Position	Engineering Student
Responsibilities	Data analysis. Electric arc furnace duties executed as part of shift work. Adaptation of a raw material addition system developed at Iscor Pretoria Works to the electrical arc furnaces plant at Vanderbijlpark Works.

6.2 Postgraduate Experience

Employer	Iscor Pretoria Works
Period	1993/12 - 1994/08
Department	Advanced Process Control Group
Supervisor	Mr Ben de Vos (Electrical Engineer)

Position	Engineer In Training
Responsibilities	<p>Process and data analysis related to the electric arc furnace process.</p> <p>Modelling of electric arc furnace process.</p> <p>Development of process modelling software in C++.</p> <p>Development of process simulation and control software in Gensym G2.</p>

Employer	University of British Columbia
Period	1994/09 - 1995/07
Department	Department of Process Engineering
Supervisor	Prof. J.K. Brimacombe and Prof. I. Samarasekera
Position	Visiting Student
Responsibilities	<p>Modelling of the continuous billet casting process.</p> <p>Application of neural networks to continuous billet caster mould design.</p>

Employer	Iscor Ltd
Period	1995/03 - 1995/07
Department	Research and Development
Supervisor	Mr Johan Groenewald
Position	Engineer in Training
Responsibilities	<p>Modelling of post-combustion lances for a novel iron ore smelting process.</p> <p>Analysis of the application of pulverised coal injection to the blast furnaces at Iscor Vanderbijlpark works.</p>

Employer	Iscor Heavy Minerals
Period	1995/08 - 1999/07
Department	Advanced Process Control Group
Supervisor	Dr W.H. van Niekerk
Position	Process Engineer and Lead Process Engineer
Responsibilities	<p>The following duties during 6 pilot-scale ilmenite smelting campaigns:</p> <ul style="list-style-type: none"> ○ Automation system planning, implementation and commissioning. ○ Information system design, implementation, commissioning and support. ○ Plant commissioning. ○ Process supervision. ○ Advanced process control system implementation, commissioning and support. <p>Development of an advanced process control system for an ilmenite smelting furnace.</p> <p>Development of a simulation philosophy and implementation of the philosophy in Gensym G2.</p> <p>Development of a high-fidelity simulator of an ilmenite roaster plant in Gensym G2.</p> <p>Support the project team designing the industrial- scale smelter plant by doing design and costing calculations.</p>

Employer	CSense Systems
Period	1999/08 - 2000/07
Department	Process Solutions
Supervisor	Dr J.A.M. Rademan
Position	Project Manager

Responsibilities	<p>Development of a decision-support system for an ilmenite smelting DC arc furnace at Namakwa Sands.</p> <p>Development of a model of a basic oxygen steelmaking furnace for Iscor Research and Development.</p> <p>Support during a pilot-scale ilmenite smelting campaign run by Iscor Heavy Minerals.</p>
Employer	White Peak Consulting CC
Period	2000/08 - 2001/09
Department	None
Supervisor	None
Position	Sole Member and Consultant
Responsibilities	<p>Complete development of a model of a basic oxygen steelmaking furnace for Iscor Research and Development.</p> <p>Develop and teach a semester course on mineral processing to 4th year students at the University of Pretoria.</p> <p>Development of a functional specification for control and information systems on the planned Ticor South Africa ilmenite smelter plant.</p> <p>Develop a unifying information system philosophy that facilitates the use of all types of process data in automated and higher-level systems.</p> <p>Support during a pilot-scale ilmenite smelting campaign run by Iscor Heavy Minerals.</p> <p>Planning of the final development and implementation of an advanced process control system for the then planned Ticor South Africa ilmenite smelting DC arc furnace.</p> <p>Business management.</p>
Employer	Ex Mente (Pty) Ltd
Period	2001/10 - present
Department	None
Supervisor	None
Position	Managing Director and Process Engineer
Management and Other Responsibilities	General management, financial management, planning, strategy development and implementation, and marketing.
Process Engineering Responsibilities	<p>Support during two pilot-scale ilmenite smelting campaigns run by Iscor Heavy Minerals.</p> <p>Final development and implementation of an advanced process control system for the Ticor South Africa ilmenite smelting DC arc furnace number 1. Responsibilities included:</p> <ul style="list-style-type: none"> ○ Requirement analysis. ○ System design. ○ Software design and development. ○ Software and system testing. <p>Assistance with commissioning of the feed system of Ticor's ilmenite smelting DC arc furnace number 1 prior to furnace start-up. This was done as a result of the significantly important role that accurate metering of inputs play in an ilmenite-smelting operation.</p> <p>Commissioning support on Ticor's ilmenite smelting DC arc furnace number 1 over a period of 3 months. This work was shift-based and involved process supervision and troubleshooting, during the commission phase of the furnace.</p>

The following was done during a number of pilot-scale smelting campaigns for Kumba Resources:

- Implementation and further development of a process-level information system.
- Development and implementation of process analysis and decision support tools.

The following was done for Bayside Aluminium on one of their heat treatment furnaces.

- Process and requirement analysis.
- Development of a process model of the furnace, and subsequently using this model in a simulator environment to analyse the process and study possible control strategies. The simulator was also used to develop and test the final control strategy.
- Development of an on-line process model for the furnace. These duties excluded software development.
- Development of a closed-loop controller for the furnace. These duties excluded software development.
- Commissioning of the developed system.
- Remote support of the system. This is ongoing.

Various process modelling projects.

7 PUBLICATIONS

Conference Presentations

- **Zietsman** J.H., 2006. Simulation, On-Line Modelling And Optimising Control of a Continuous Aluminium Billet Homogenising Oven. 2006 Automation and Control Colloquium.
- **Zietsman** J.H. and **Pistorius** P.C., 2005. Thermal dynamics of an ilmenite-smelting furnace sidewall. 2005 Heavy Minerals Conference.
- **Zietsman** J.H. and **Pistorius** P.C., 2005. Modelling of an ilmenite-smelting DC arc furnace process. Minerals Engineering International.
- **Zietsman** J.H. and **Pistorius** P.C., 2004. Process mechanisms in ilmenite smelting. Mineral Processing 2004.
- **Zietsman** J.H., 2004. Application of the ThermoLab modelling framework to the development of simulators for pyrometallurgical processes. Process Engineering in the Fast Lane.
- **Zietsman** J.H. and **Kruger** J., 2003. Using InControl to implement advanced control on a Smelter. Wonderware User Group Conference.

Magazines

- **Zietsman** J.H., 2006. Simulation, Higher-Level Automation and Optimization of continuous aluminum Billet Homogenizing Furnace. Aluminium World. April 2006.
- **Zietsman** J.H., 2004. Application of the ThermoLab modelling framework to the development of simulators for pyrometallurgical processes. Chemical Technology. July 2004.

Refereed Publication

- **Zietsman** J.H., **Eksteen** J.J., **Fourie** D.J., 2005. Calculation of FeO-TiO₂-Ti₂O₃ liquidus isotherms pertaining to high titania slags. Journal of the SAIMM. Journal of the SAIMM. November 2005, vol. 105.
- **Zietsman** J.H. and **Pistorius** P.C., 2005. Modelling of an ilmenite-smelting DC arc furnace process. Minerals Engineering.
- **Zietsman** J.H. and **Pistorius** P.C., 2004. Process mechanisms in ilmenite smelting. Journal of the SAIMM. Dec, vol. 104, no. 11, pp. 653 – 660.
- **Zietsman** J.H., **Kumar** S. and **Brimacombe** J.K., 1998. Taper design in continuous billet casting using artificial neural networks. Ironmaking and Steelmaking, vol. 25, no. 6, p. 476.

8 REFERENCES

The following list contains people with which Dr Zietsman has worked with in the metallurgical industry for extended periods of time:

Name	Company / Institution
Prof. P.C. Pistorius	Pretoria University
Mr D. Bessinger	Kumba Resources R & D
Dr W.H. van Niekerk	Zincor
Mr J. Meyer	Kumba Resources R & D

9 COMPANY REFERENCES

Since starting work at Ex Mente, Dr Zietsman has performed work for the following companies:

Company / Institution
Ticor South Africa
Kumba Resources (Alloystream)
Kumba Resources R & D
Bayside Aluminium (BHP Billiton Group)
DMS Powders (BHP Billiton Group)
Highveld Steel and Vanadium
UCAR South Africa (GrafTech Group)
University of Pretoria
