



FOSKOR

Phosphoric Acid Plant SIMULATOR

Background

Foskor Pty Ltd is a well-established South-African Group of Companies. The Group has grown from a single phosphate mining operation 63 years ago to become one of the world's largest, most dynamic phosphate and phosphoric acid producers.

The Richards Bay Plant consists of the following:

Three Sulphuric Acid plants with a combined capacity of 6400 tons of sulphuric acid per day.

Two Wet Process Phosphoric Acid plants with a combined capacity of 720000 tons phosphoric acid (as P_2O_5) per year.

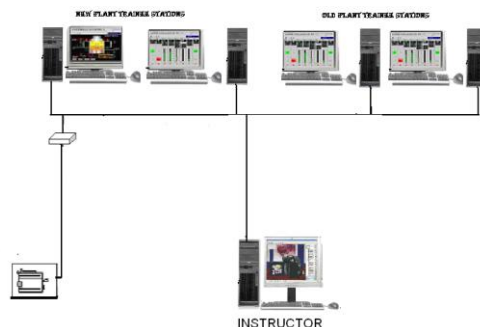
One DM Weatherly NPK plant with a capacity of 400000 tons granular product per annum.

Foskor Richards Bay is the largest producer of phosphoric acid in the Southern Hemisphere.

SCOPE OF SUPPLY

Sim Infosystems has developed simulator for Old & New Phosphoric Acid plants and A/B & C Sulphuric Acid plants of Foskor. The simulator was installed and commissioned during May 2013 and consists of the following major components:

- Simulator computers and peripherals
- ProSimulator Simulation platform
- Instructor Station software
- Operator Station – CS3000 emulation
- Custom simulation models for Old & New Phosphoric Acid plants
- Custom Simulation models for A/B & C Sulphuric Acid Plants (2015)
- Custom simulation model for Granulation plant



The simulation models are developed on the state-of-the-art "ProSimulator" dynamic simulator. ProSimulator is an integrated dynamic simulation environment consists of Instructor station s/w, real-time database, operator station emulation s/w, interface s/w to DCS and dynamic simulation development package.

Simulation modeling platform

The custom simulation models for Old & New phosphoric Acid plants are developed during 2012-13 and tuned to meet the actual plant parameters and dynamic performance. Each simulation model consists of:

Reaction and Filtration

Rock feed to the attack, Reaction tank (attack) and Flash cooler, Digestion, Filtration, Gypsum slurry disposal, Gas scrubbing

Concentration

*Weak acid storage and clarification
Concentration units & Fluorine recovery,
Acid cooling, clarification & storage
Export tank storage, Common to both Reaction & Filtration and Concentration is the cooling water system and the effluent handling area.*

The custom simulation models for A/B & C Sulphuric Acid plants are developed during 2014-15 and consists of:

*Sulphur melters, Sulphur Filters
Air Compressor, Sulphur furnace
Steam superheater, Waste Heat Boilers
Converters (5 beds)
Inter absorption tower, Economiser, Cold & Hot heat exchangers, Final absorption tower*

The custom simulation model for Granulation plant was developed during 2016-17 and consists of:

*Scrubbers, Ammonium phosphate reactor,
Granulator, dryer, product system, Process screening and Milling System, Intake system and Ammonia operations.
MAP, DAP and MAPS conditions are simulated.*

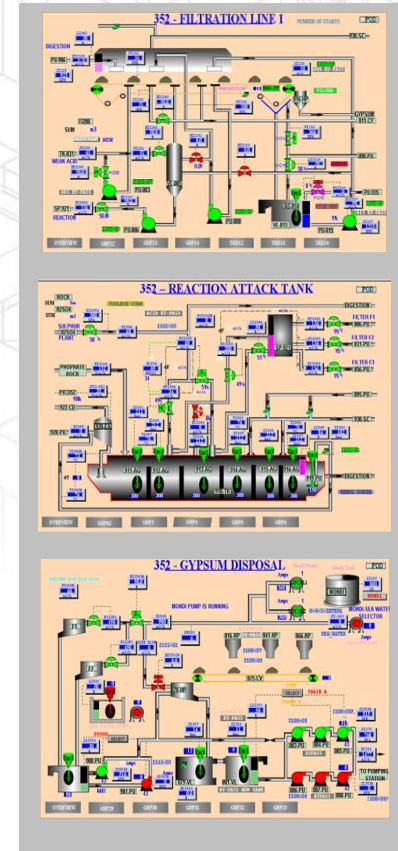
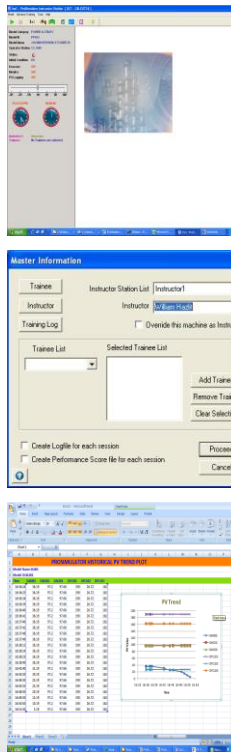
FOSKOR Simulator

INSTRUCTOR STATION

ProSimulator Instructor station enables the instructor to control and direct the training sessions. From the Instructor station, multiple independent training sessions can be invoked by the Instructor and each training sessions can be assigned to work with one or more operator stations. Using this software the Instructor can load a model, invoke malfunctions and monitor the performance of the trainee.

OPERATOR STATION

The simulator is provided with emulation for Yokogawa Centum CS3000 DCS. All functions and features that are essential for training are included in the emulation. The controls and interlock logic are also simulated and provides exact replica of the real plant systems. The field operations are simulated through separate FOD graphics on the operator station.



CS3000 Emulation

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THE PHOSPHORIC SIMULATOR STORY

After a training need's analysis identified that the competencies of the Plant Process Operators at Phosphoric Acid Plant should be enhanced.

Sim InfoSystems were approached to assist with the design and development of simulator software for the Phos Acid plant.

The process started in June 2012 and was concluded in June 2013.

The aim is to assist the Phos Acid Plant in the training of PPO's in order to give the PPO's an opportunity to learn how to control the plant without having a negative impact "cost impact" on the production.

Refresher training will also take place on a yearly basis to ensure high competency levels of the PPO's remain.

The outcome of the training will be advantageous to the production team through increased efficiency and a reduction in the maintenance costs and an increase in the competency levels of the PPO's.

The following is just a few of the simulations that can be done on the simulator.

- Motors that trip
- Valves that close due to insufficient air supply.
- High ambient temperatures
- Upset plant conditions
- Fouling in the production lines.

Thus far 4 groups of PPO's have attended the simulator training and the feedback was very positive from each group.



Front: Rajasekhar Nadendla (SIM Infosystems) & Sam Mbuyazi (Concentration Engineer)
Back: Arunchanth Sethuram (SIM Infosystems), Wim Fourie(TM Specialist), V. Raman (SIM Infosystems), Sunil Laldas (Project Leader Concentration), Fana Shoji (R&F Engineer), Thys Schnuir (Project Leader R&F)

Enquiries: **M.J.P. Schnuir**Our Ref: **Performance Certificate Sim Infosystem**Your Ref: **Performance Certificate Sim Infosystem****12 June 2014****PERFORMANCE CERTIFICATE**

This is to certify that M/s. Sim Infosystems Pvt Ltd, Chennai has supplied an Operator Training Simulator system to our Company during 2013 with the following components:

Simulation hardware

Instructor software

CS3000 emulation software

Custom simulation models for New & Old Phosphoric Acid plants

We are happy with the software performance and in-time and within-budget completion of the project by Sim Infosystems. We are able to use the simulator effectively for our training. Sim Infosystems has also provided necessary support during the warranty period.

We have no hesitation in recommending Sim Infosystems as a proven and quality OTS vendor to other process companies.

With best regards

**W.C.A. Fourie****Training and Development Manager**
Foskor PTY (Ltd)

Enquiries : S.M. DUBE
Our Ref : Performance Certificate Sim Infosystems
Your Ref : Performance Certificate Sim Infosystems

01 March 2017

PERFORMANCE CERTIFICATE

This is to certify that M/s. Sim Infosystems Pvt Ltd, Chennai has supplied a Custom simulation model for Granular Fertilizer Plant Operator Training Simulator to our company during 2017.

We are happy with the software performance and in-time and within-budget completion of the project by Sim Infosystems. We are able to use the simulator effectively for our training. Sim Infosystems has also provided necessary support during the warranty period.

We have no hesitation in recommending Sim Infosystems as a proven and quality OTS vendor to other process companies.

With best regards


W.C.A Fourie
Training and Development Manager
FOSKOR PTY (Ltd)

DIRECTORS: Mr MG Qhena (Chairman), Mr U Khumalo (CEO/ President), Mr JR Barton, Ms J Gaveni, Mr B Mawasha, Mr VD Mazibuko, Ms N Medupe, Mr NG Nika, Dr DS Phaho, Mr V Ravichandran (India), Mr VS Sahney (India), Ms L Sennelo, Mr G van Wyk, Mr A Vellayan (India), Ms AUS Khanyile (Company Secretary)

Enquiries : V.S. Madonsela
Our Ref : Performance Certificate Sim Infosystems
Your Ref : Performance Certificate Sim Infosystems

01 March 2017

PERFORMANCE CERTIFICATE

This is to certify that M/s. Sim Infosystems Pvt Ltd, Chennai has supplied a Custom simulation model for Sulphuric acid Plants (A & B and C) Operator Training Simulator to our company during 2015.

We are happy with the software performance and in-time and within-budget completion of the project by Sim Infosystems. We are able to use the simulator effectively for our training. Sim Infosystems has also provided necessary support during the warranty period.

We have no hesitation in recommending Sim Infosystems as a proven and quality OTS vendor to other process companies.

With best regards



W.C.A Fourie
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