STOCKPILE VOLUME MONITORING

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"any sufficiently advanced technology is indistinguishable from magic." Arthur C. Clark
Agenda

- Overview
- **Automatic Stockpile Monitoring**
  - Woodchips / Coal / Sulphur / Logs
- **Architectural layout**
- **Operational & Management Reporting**
- **Reference Sites**
- **Cost Structure**
- **Additional Monitoring areas**
  - OCR
  - Weigh Bridge (Density)
  - Trains
  - Load Classification
- **References**
Overview

Most important to determine the correct tonnage's by **accurate bulk densities and reliable volumetric surveys**. We believe that such monitoring should be done by an **independent and unbiased agency**, and not be monitored by a party who might have a vested interest.

**Automatic 3-dimensional Dynamic Measurements: 3DM**

**Contact-free measurement** technique based on photogrammetric principles: **science of geometry, mathematics and physics** that uses the 2-dimensional image of a 3-dimensional scene to reconstruct a reliable and accurate model of the original 3D scene.

Custom-designed for **repetitive and fully automatic measurement** tasks.

The unique benefits of the 3DM Technology include 3D measurements of **moving objects** or objects changing shape, fully automatic during operation and provide permanent, digital, records of the objects.

Key strength of 3DM Analyst is **versatility** - Any size object can be measured, from a range of a few metres to several kilometres away. with the **results available in seconds**, almost in real-time.
Automatic Stockpile Monitoring
Close-Range Photogrammetry is an **accurate, cost effective technique** of collecting measurements of real world objects and conditions directly from high resolution IP cameras. Photogrammetry utilizes digital images to obtain accurate measurements and geometric data of the image, in order to provide spatial information for 3D measurement.

Benefits of close-range photogrammetry:

- Increased accuracy;
- Complete as-built information;
- Reduced costs;
- Do not need to stop operations;
- Effective for small and large projects.

Suitable photography involves taking a **pair of convergent images** of the same scene from separate positions.

3DM Analyst is a set of specialised software tools designed to extract accurate 3D spatial measurements by analysing images taken with digital cameras.
SAPPI STOCKPILES: Woodchips
SAPPI STOCKPILES: Sulphur
SAPPI STOCKPILES: Logs
SAPPI STOCKPILES: Image Capture
Architectural layout
Operational & Management Reporting

- Providing a 'Managed System' reducing management overhead
- Complete coal Internet Data hosting and reporting portal specifically designed for the utilities industry.
- Using OCR to record all trucks / trains numbers and weight
- Providing a central database that will store all vehicle records
- Internet to view transactions & size of the coal stockpile
- Providing an automated method on delivery of coal
- Freeing staff from checking manually on size of the coal stockpile
- Alerts via SMS message / e-Mail / pop up
- Share data between sites and head office
- Providing monitoring cameras for live view of stock pile
- Providing enforcement software for prosecution on type of coal delivered.

Coal Watch Solution
Reporting and Management

- Uptime and site availability
- Lane / Department / Terminal / Location
- Sort By – License Plate / Name / Surname / Enroll ID / Time etc
- Sort by Period: Yesterday, Today, Last Week, This Week, Last Month, This Month, Month and Year, Date Range, All Current Year, etc
- Global Date
- Print to Screen, Printer or XLS everywhere
- Month end statements and customer reports;
- Average time on site, average weight, etc.;
- Coal category per site;

Nothing can be deleted

Audit Trail

- Movement of data to Current, Not Active or Deleted
- Clocking data controlled by Status
- Full history of changes of every record
References: Africa

SAPO, Durban Port
Spoornet
High Veld Steel, Witbank

References: International

“The results …… have indicated that 3DM is more accurate, faster, more flexible, easier to use, more robust and more rapidly developing, provides better quality models, has better software support and requires less training. Based on technical considerations 3DM software….. provide the best solutions for BMA.”

— BMA Coal

“After exhaustive testing of 3DM for coal mines in western Venezuela, we are convinced that the software provides reliable and accurate results in a fraction of the time required by traditional (means) We believe this solution offers the same or better precision …..at much lower cost. The system is an eminently practical solution for surveying mines in developing countries ….

— Mark Lander, Carto Sur C.A.
Cost Structure

SOFTWARE: A number of options:

- 3DM Analyst Lite: Less demanding workloads, up to 16 MB, 2 images at a time

- 3DM Analyst Lite Suite: Larger workloads, reduce no. of control points, up to 24 MB, 10 images at a time

- 3DM Analyst Mine Mapping Suite: Very large workloads, supports image merging and camera calibration, up to 65 MB, any no. of images at a time, multi-threaded
Cost Structure

PRICE: A number of options:

- Cost per ton measured
- Cost per transaction
- Fixed monthly cost
- Capital amount
Additional Options with the software

- Product sizing
- Product colour
- Train volume
- Truck volume
- Conveyor belt 3D volume
What is Optical Character Recognition?

OCR is an image processing technology used to identify vehicles by their license plates or trains by their unique numbers. OCR is a non-intrusive, computerised method of matching a License Plate / Train number to a database of registration numbers.

Alternate names for OCR:
- License plate recognition (LPR):
  - Automatic Vehicle Identification (AVI)
- Car Plate Recognition (CPR)
- Automatic Number Plate Recognition (ANPR)
Additional Info: LPR

- LPR Server
- Camera/Illumination unit
- RG59/IP/twisted pair/Wireless/ADSL/3G/iBurst
- Open boom/Display message/Generate alarm
- LPR Client
  - Possibly on site, remote or mobile

NU18637
Volumetric Measurement at Weighbridge
TRAINS

sappi

Sub Saharah Scales
LOAD CLASSIFICATION

Load Recorded?

- TYPE:
  - Wattle?
  - Gum?
  - Rejected
Additional Info: Maintenance and Support

- E-mail / PH support
- Remote PC control
- 2 hour response time
- 6 hour response time
- Same business day
- 24 hour response

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Summary

- Solid product with little support required
- Local design and support, Built in SA for SA clients
- Unique solution and customizable to your requirements
- In development since 2003 and ongoing
- Open SQL Database / Easily accessible data / Easy integration

Way Forward?

- Quote / Consult / Cost per ton measured / Other?

Thanks & Questions

- Thank you for your time
- Any Questions?
References


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