TECHNOLOGICAL CAPABILITIES, APPLICATIONS AND PROCESSES
LASER SCANNING

- PENTA’s state of the art 3D scanner captures the existing conditions of the project site
- This technology lets PENTA accurately and efficiently gather data and the condition of existing buildings, equipment, storage piles, mining areas, and other plant assets
- Simultaneously takes panoramic photos of the project site
- Collects data at +/- 2mm accuracy within 130m range
LASER SCANNING

- Records existing conditions with great accuracy
- Minimal manpower needed to produce scans
- Powerful tool for multiple departments (maintenance, engineering, records, etc.) and future projects
- Reduces conflicts during Construction

SCAN DATA

PANORAMIC PHOTO
LASER SCANNING

• PENTA uses scan data during the design and engineering process, ensuring accuracy in construction.
• Very effective when working with existing structures and equipment.
• Multiple uses ranging from an entire facility to a specific piece of equipment.
• Data collected is used directly in design software, for every discipline.

PLAN VIEW OF SCAN

ELEVATION VIEW OF SCAN
LASER SCANNING

- Reduces risk of injury to staff attempting to collect data
- Access to electronic project/plant data on PC
- Reduces travel costs
- Reduces amount of equipment needed to collect electronic data in the field

SECTION VIEW OF SCAN

2D RECORD DRAWING OF SCANNED EQUIPMENT
LASER SCANNING

Laser Scanning Benefits

- Accurately measure +/- 2mm at a range of 130m, 360° from scan location, and collects roughly 1 million points per second.
- Scan model used in design 3D design process to ensure the most cost efficient constructability.
- Documented panoramic images of all scanned areas.
- Ensured up to date conditions of plant and/or project site, and can eliminate the issue of inaccurate or out of date information.

FULL SITE SCAN INTEGRATED WITH CURRENT DESIGN
LASER SCANNING

EXTERIOR SITE SCAN
CIVIL/MINING 3D SOFTWARE

- PENTA uses state of the art civil design software for site specific engineering tasks
- Model based volume and quantity takeoff for cut and fill, concrete, storage piles, mining locations
- Easily works with drilling info, survey data, and GIS (Geographic Information Systems) data plus more
- Robust utility design package for water, sewer, cable, pressurized pipes, with conflict detection in a 3D environment

UG UTILITY NETWORKS

PLANT SITE VISUALIZATION
CIVIL/MINING 3D SOFTWARE

- Integration with scan to provide quantities for mining and storage
- Storm water analysis for SWPPP and SWMM submittals
- Automatic updates to construction documentation
- GPS support during construction for earth moving equipment
- Design to site comparison analysis, to ensure civil construction accuracy

DESIGN/CONSTRUCTION COM P.  GRADING AND PAVEMENT PLAN
Civil/Minning 3D Software

Civil Modeling and Analysis Benefits

- Instant, accurate and up to date material takeoff for roadway, pavement, and earthwork
- Instant reporting for storm, sanitary and utility networks regarding properties and takeoff
- Integrated storm water analysis
- Automatic updates to drawings via Model Visualization
- Field integration with GPS navigated equipment
- Integration of Laser Scanning
- Integration with structural and mechanical model
- Field stakeout and location and elevation field verification
CIVIL/MINING 3D SOFTWARE

PLANT SITE VISUALIZATION
MECHANICAL/ STRUCTURAL 3D SOFTWARE

- PENTA uses state of the art software for both its Mechanical and Structural design needs
- Model integration improves team communication
- Improves project coordination
- Integration with engineering software.
- Automatically updates construction drawings for any model update
MECHANICAL / STRUCTURAL 3D SOFTWARE

• Quantity takeoff for steel, concrete, grating, etc
• Integration with coordination software to identify issues in design model
• Visualization to convey project intent to non-technical personnel
• Reduces drafting effort extensively

QUANTITY TAKEOFF

STRUCTURAL PLAN
MECHANICAL/ STRUCTURAL 3D SOFTWARE

Modeling/BIM benefits

• Integrated mechanical and structural model enhancing communication and accuracy
• Quantity takeoff
• Visualization
• Automatically updated construction documents
• Integration with engineering software platform
• Collision detection
MECHANICAL/STRUCTURAL 3D SOFTWARE

PREHEATER TOWER RENDERING
COORDINATION/ COLLISION/ PRESENTATION 3D SOFTWARE

- Allows confirmation of correct positioning for all disciplines
- Creates large site renderings for mining and plant locations
- Creates clash detection reports for all aspects of project
- Eliminates many costly construction issues
- Integration with design software enables user to fix issues quickly
- Creates project animations

Collision with existing duct

Collision of new duct with support ring
Collision Detection and Presentation Benefits

- Detecting construction issues before it appears in the field
- Save clients money on costly change orders
- Ensure accuracy in design
- Convey project intent to non-technical personnel
- Confidence in location and fit of new project
PROJECT VISUALIZATION/RENDERING

- PENTA is also available to assist in conveying project intent through visualization
- Show project intent
- Public relations
- Stakeholder/Owner meetings

CEMENT TERMINAL

SALT STORAGE/SHIPPING FACILITY
PROJECT VISUALIZATION/RENDERING

Clinker Cooler

Orc Area

Frac Sand Mining Site

Model Section of Cement Terminal
PROJECT VISUALIZATION/RENDERING

EQUIPMENT
PROJECT VISUALIZATION/RENDERING

NORTH VIEW
FRAC SAND PLANT

SOUTHEAST VIEW
FRAC SAND PLANT