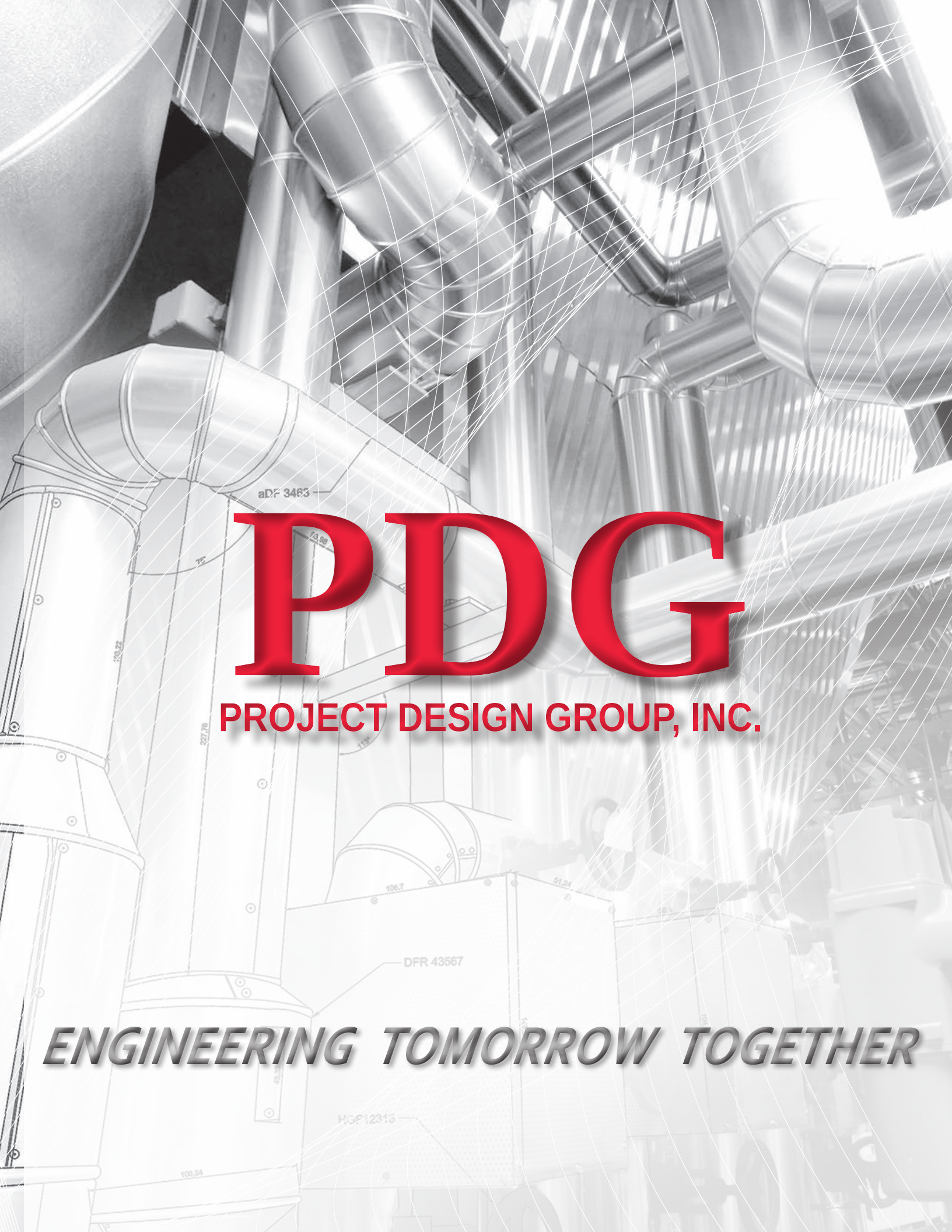


PDG

PROJECT DESIGN GROUP, INC.

ENGINEERING TOMORROW TOGETHER

Everything is designed Few things are designed well

BUILT FROM THE GROUND UP WITH OPERATIONS AND CONSTRUCTION EXPERIENCE

Project Design Group, Inc. is a multi-discipline, full service, engineering & construction firm dedicated to providing accurate, efficient, cost effective, project services, delivered on time, accident free, with exceptional customer service.

Our diverse staff has been gathered from a variety of backgrounds for their specialized experience. We have a proven track record of assisting clients with all phases of their projects including studies, scoping, scheduling, detail design and construction management. Our capabilities range from the specification of a single piece of equipment, to complete multi-disciplinary design of complex industrial systems, and project management.

The next time that you need engineering services, contact PDG and let our experts help develop a solution that's right for you.

REACHING THE EXPECTATIONS

VISION

To work with our customers with the best people to be the preferred supplier of project related services in the Southeast.

MISSION

Our mission is to use valuable resources to create processes and facilities that enhance the business of our customers. We work together with our customers and strive to build long-term relationships based on mutual trust and respect.

CORE VALUES AND PRINCIPALS

RESPONSIVE To be timely and proactive in our response to clients. We are responsible and dedicated to our work.

PEOPLE Our clients and our people are what make us successful.

HEALTH, SAFETY AND THE ENVIRONMENT We are committed to the Health and Safety of our employees, clients, suppliers and the Environment.

INTEGRITY We deal openly and honestly with everyone.

CUSTOMERS We work with our customers to understand their needs from us to meet their goals. We give them our best to build long-term relationships.

RELATIONSHIPS We build long-term relationships with our customers and suppliers.

REPUTATION We continue to build and protect our reputation.

ACCOUNTABLE We always strive to keep our commitments and acknowledge our mistakes.

QUALITY IMPROVEMENT We continually improve both individually and as a company to deliver quality services.

FINANCIAL PERFORMANCE We manage our business wisely and exercise good business judgement to ensure our company has a bright and secure future.

ENGINEERING TOMORROW TOGETHER

Company History

- Project Design Group, Inc. was formed in Fall 2003
- Aquired General Contractors License for Construction in 2013
- Engineering, Project Management, and Construction

Our Focus

Markets

- Petrochemical & Chemical
- Pulp & Paper
- Specialty Chemical
- Refining
- Wood Products
- Power

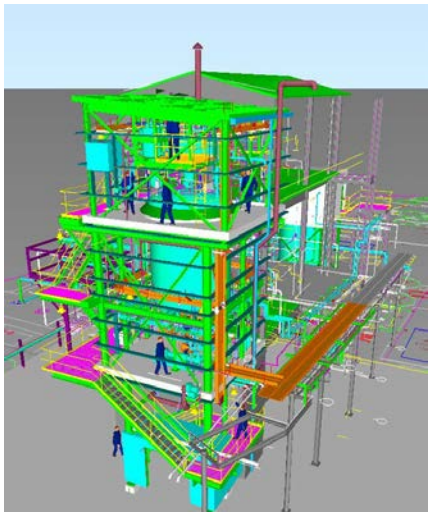
IT'S NOT HARD TO DEFINE EXPERT DESIGN

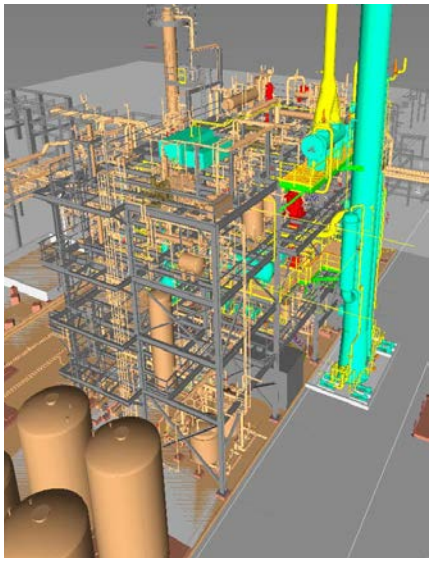
Designing User Friendly Systems

Model Reviews help with getting input from the facilities, maintenance and operations staff. Allowing them to educate the design team on specific ways that would be helpful in the long term operation and maintenance of the system. This can reduce the total cost of ownership of the system by reducing operation and maintenance inefficiencies.

Reducing Project Cost

In the study phase of projects these quick preliminary models allow for better cost estimates by allowing bulk material takeaways from a model. These early phase models also help to work out issues with precision such as general arrangements. As the project moves into detail design these models continue to be developed up to the final design.





Senior Experience

All of the key project roles are led by Engineers and Project Managers with more than 20 years of Industrial engineering experience. This knowledge enables our project team to see the underlying project issues and initiate plans to reduce project risks.

Specialized Skills

Often projects require specialized expertise to accomplish the job scope. Some of these specialized services include Pro/II Modeling for chemical process engineering and Caesar II piping stress analysis for high pressure, high temperature piping engineering.

"From concept to construction, we work together."

WES GERHARDT - *OWNER / PRINCIPAL ENGINEER*

TAKING DESIGN TO THE NEXT LEVEL WITH OUR ADVANCED TOOLS

Timberline Estimating

Caesar II – Piping Stress Analysis

STAAD – Finite Element Structural Analysis

RAM Elements – Finite Element Structural Analysis

Design Flow Solutions – Hydraulic Network Software

CADWorx 3D – 3D Plant Design Software

Autocad Plant 3D Design

Bentley AutoPlant
Navisworks Design Review

MS Project

Autocad and Autocad Mechanical

Microstation

Total Station (Plant Surveying, Grade, Model Data)

Easy Power (Power Studies, Arc Flash, Breaker Coordination, Short Circuit Analysis)

(CodeCalc, Tank, Aspen, SimSci-Essor Pro/II, ETAP)

AGI 32 and Visual Lighting Software

Laser Scanning (Leica)

Cloudworx

We provide a diverse set of project services to enhance, maintain, and protect the businesses of our clients.

MOVING FORWARD WITH SOLID ENGINEERING

Project Management

Scope Development
Funding Grade Studies
Project Planning and Scheduling
Detail Engineering
Construction Technical Bid Packages
Grant Writing, Funding Applications, Permits
In-Plant Support
Contract Management

Construction Management

Turnaround and Shutdown Planning
Quality Management
Safety
Constructability
Startup and commissioning
Construction Co-ordination
Field Engineering
Contract Management

Project Controls

Cost Control and Tracking
Scheduling
Planning
Materials Management

Systems / Process Design

Mass Energy Balances
Simulations and Studies
PFD and P&I Diagram Development
Hydraulic Studies
Relief System Studies and Calculations
Process Equipment Specification
Trouble Shooting Hydraulic Systems and Utility Systems
Material Selection
Power/Steam, Solids Handling, Pulp and Paper, Refining, Chemicals, Waste Treatment
PSV Calculations and Studies
Process Design and Analysis
Environmental Compliance Systems

Mechanical

Mechanical Equipment Engineering
Equipment Specification and Design (including Pumps, Compressors, Chillers, Boilers, Turbine Generator Sets, Cooling Towers, Tanks, Pressure vessels, Tanks, Columns, Heat Exchangers, Fired Equipment, Etc.)
Hydraulic Network Analysis
Solids Handling
(Including Pneumatic Conveying)
Failure Analysis
Fabrication Quality Audits
Equipment Reliability and Improvement
Maintenance and Lift Planning
Mechanical Integrity Program
HVAC Engineering

Engineering

Studies
Front End Loading
Funding Grade Studies
Scope Definition
Cost Estimates
Specifications
Project Management
Detail Design (All Disciplines)
Analysis (Stress, Structural, Hydraulic)
Equipment Supplier Shop Inspections
Field Engineering
Planning & Scheduling

Piping

Plot Plans & Layouts
General Arrangements
3D Plant Design [CADWORX]
Pipe Routing and Fabrication Isometrics
Piping Stress Engineering and Analysis (Caesar II)
Pipe Specification Development
Maintenance, Installation and Planning
Field Engineering and In-Plant Support
High Pressure (2800 psig) and High Temperature Experience

Electrical / Instrumentation

Electrical single line & motor load list development
Easy Power System Studies – modeling [short circuit, load flow, arc flash & protective coordination studies]
Electrical Equipment Specification [switchgear, transformers, MCCs, VF drives, motors]
Power and Control cable and tray sizing and routing
Motor Control Schematics
Lighting Analysis and Design
Grounding Plans Incorporating IEEE and NEC
Fabrication Quality and Factory Acceptance Test Audits
Instrument Specification [flow, level, pH, temperature, pressure, oxygen, etc.]
Control Logic Detail Development Support
P&I Diagram Development
Analyzers for Process and Environment

Civil / Structural

Site Development and Site Plans
Storm Water Management Studies and Improvements
Retaining Wall Design
Foundation Design
Concrete Design
Fall Protection Systems
Rigging and Lift Planning
Finite Element Analysis
Structural Analysis and Design (STAAD & RAM)
Structural Evaluations and Retrofit Design
Seismic and Wind Analysis / Design
Bridge Crane, Monorail, and Lifting Beam Design
Tank Support Structures and Pipe Bridge Design
Access Platform, Mezzanine, Stair and Handrail Design
3D Modeling, Construction Drawings, Detail Drawings
Surveying Services - Total Station
Construction Cost Estimating and Support

ONE SCANNING SOLUTION
START TO FINISH

How it Works
A spinning and rapidly pulsating laser beam rotates around the vertical axis emitting 1 million points per second. Each pulsating beam of light then bounces back to the scanner. Based on a precise measurement of the time the beam traveled to and from the object, the scanner is able to accurately determine the distance of a specific point. Then by using this distance with a reference laser distance and the angle of the mirror the scanner is able to determine the specific location of a single point. Then by merging a photo with the scanned data a photo realistic 3D point cloud is created.

Step 1 – Field Scanning
Our expert surveyors use industrial grade ultra-high speed Leica scanners to take into the field. They then position the scanner and targets to get a scan from each vantage point around an object to make sure that they have scanned all surfaces included in the object.

Step 2 – Registration
Next the raw data that has been captured with the scanner is loaded into special software that stiches each scanned vantage point together to create a single point cloud. This process is called registration. The scans can also be accurately referenced to through the use of geolocation.

Step 3 – Publishing
After registration a variety of deliverables can be published: 2D Plans and Elevations, Panoramic Images (that enable measurements to be pulled from the image), Section and Profile Views, Wireframe and Surface Models.

IMPROVING DESIGNS WITH 3D SCANNING

Improved Retrofit Designs

Designers frequently have to design in and around existing structures for projects. Starting with a 3D scan of the existing structure and area gives a clear and accurate understanding of exactly where the current structures are located. This results in eliminating interferences and making sure that necessary clearances are maintained.

Quality Control

Scans can be used to evaluate “as-built” constructions as verification that they met the design criteria.

Increased Productivity

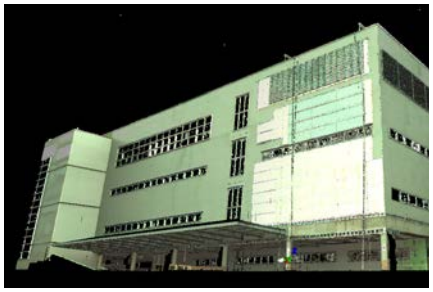
Industrial projects often have tight timelines for completion. By being able to quickly and accurately gather all of the existing measurements needed, the design teams are able to begin work more quickly. This expedites the overall project schedule.

Quickly Evaluate Concepts

A point cloud can allow you to quickly and accurately evaluate how a proposed design will fit into an existing environment.

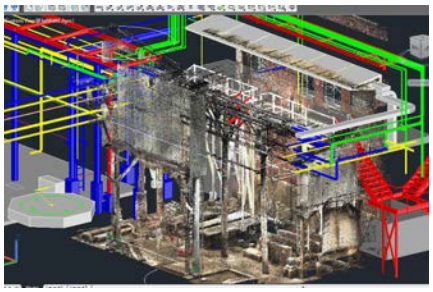
Facility Life Cycle Management

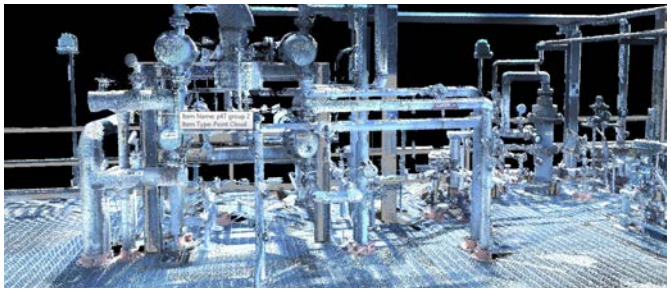
Once a scan has been performed and a point cloud has been produced, then accurate plant measurements can be taken from any part of the scan. This is helpful, not only for the current project, but for future projects as well.



Lower Surveying Cost

Manual surveying processes are time consuming and often require numerous days in the field to gather the survey information needed. Traditional surveying is also prone to costly errors, since one missed dimension could require a team to make an additional trip to acquire the missed measurement. With a 3D laser scanner the data acquisition happens much faster, and the likelihood of a missed dimension is greatly reduced.





KEEPING TURNAROUNDS ON-TRACK

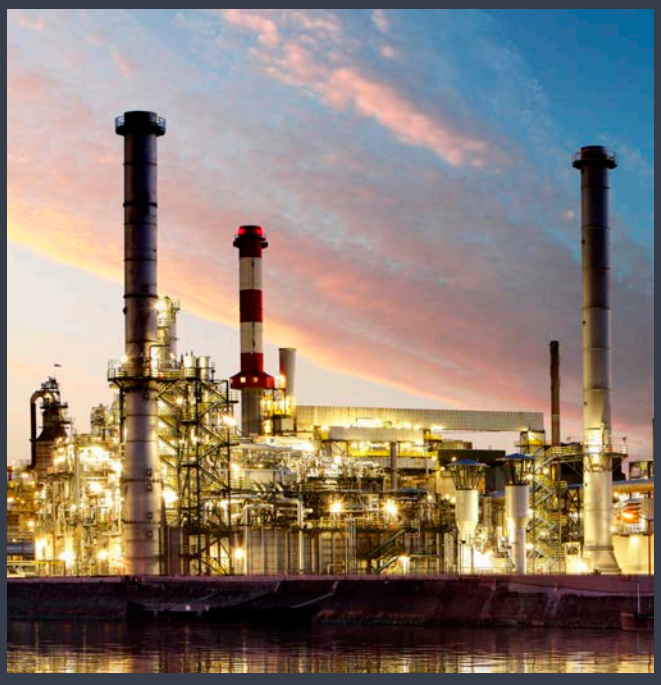
Integrated Project Schedules – Include all activities for a turnaround into a comprehensive master schedule, including schedules from, operations, maintenance, capital projects, and contractors. This helps remove interferences during turnarounds, this minimizes crew downtime. Experienced schedulers are knowledgeable about all of the steps required to complete projects from the owners, engineers, & contractors, this enables them to field verify that the projects are on track. Schedules are adjusted and updated throughout the turnaround. This approach leads to greater utilization of resources, and a reduction in the total cost and time of the turnaround. Starting up on time ensures that orders will ship on time and without loss of revenue.

Total Installed Cost (TIC) Estimates - – expert estimators know how to adjust for priced variances depending on the quantity and complexity, and can make the estimate more accurate than just using unit rates. Estimators use client preferred vendors to get more accurate pricing. Estimating software allows PDG to use a customized code of accounts based on clients standards, and can easily make estimate variations. Standard estimates are +/- 50%, +/- 30%, +/- 10%.

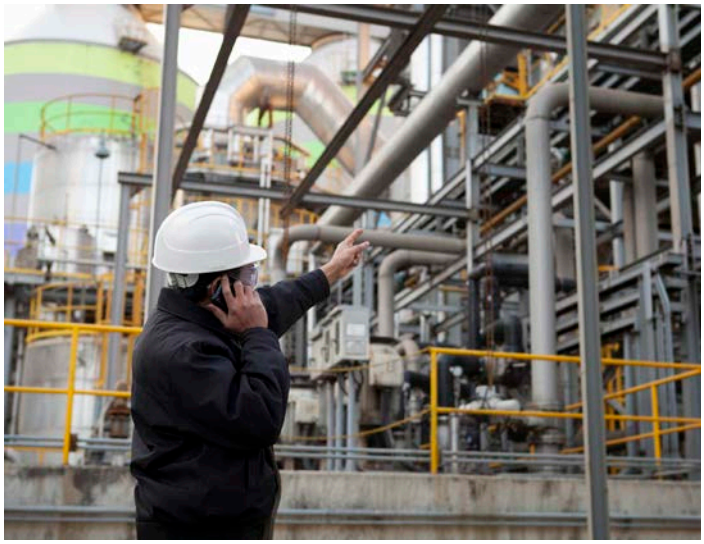
Pre-startup Inspection - ensures that the project has been constructed per the specifications and that all components are in proper working order before the client takes ownership of the completed project.

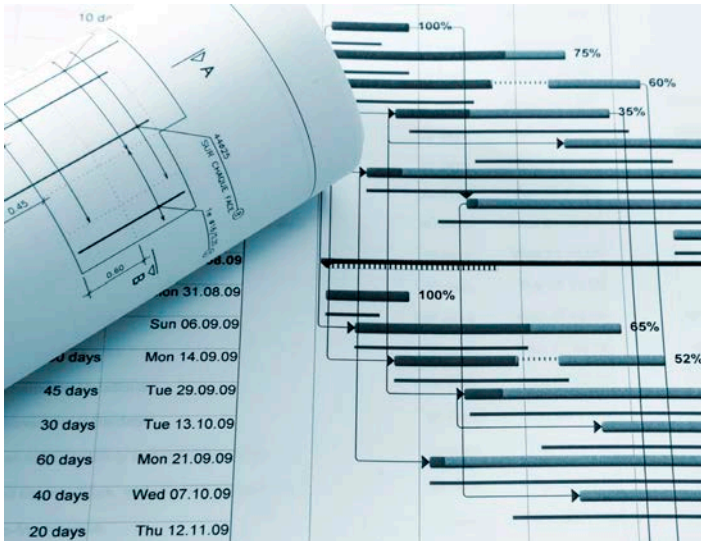
Inventory Management - provide a staging area where inventory is organized by project and only allocated to the project the inventory item was intended for. This organizes the inventory needed for the turnaround and ensures that the item is being used for it's intended purpose.

Work Order and Change Order Management - Tracking to see that the work orders are being completed within the timeframe and specifications of the scope of work.



EFFICIENT AND OPTIMIZED





Shut Down Planning Phases
Schedulers and estimators act as a hub of information between the designers and the construction personnel and help the project bridge the gap from design to completion.

5-6 months prior to outage
Preliminary schedule for the outage. Initial meeting with project stakeholders to determine the major milestones in the schedule.

1-2 months prior to outage
When construction packages are completed and contractors have been selected. A detailed schedule is prepared and schedule conflicts are worked out. Define and schedule the process of shutting down the production equipment. Maintain inventory of capital equipment projects and distribution to project work site.

During outage
Gather daily progress information from contractors and update client through daily updates to schedule and estimate.
Cost Tracking – including all change orders that have been requested and approved during the shutdown.
Projected Spending Burndown – shows a detailed account of the projected expenditures on a timeline throughout the outage.
Pre-startup inspections – develop detailed packages. Provide project oversight to ensure that the work is being performed to specification, ensure that the construction has been verified and that the client has approved the work.

Post Outage
Review schedule for lessons learned, and analyze why the variances occurred. Learn how the schedule and estimate can be approved for the next outage.

PAST PROJECT EXAMPLES

Main Tank Farm Emergency Generator

Reboiler Debottlenecking

Mill Warm Water System Optimization

Specialty Chemicals Waste Water Treatment Plant Upgrade (Funding Grade Estimate & Detail Design)

Concentrator Thermo Compressor

K2300/K2500 Hydrocracker Compressor Turbine Overspeed Protection

Paper Machine Dry End Starch Conversion

Breaker Stabilization Tank

Mill Wide Natural Gas Study

Organic Chemical Plant Expansion

Recovery Boiler Burner Management Safety System and Boiler Upgrade to Natural Gas

Lighting System Plant Upgrade

Boiler M.A.C.T. Combination Boiler Upgrade & New Power Boiler Installations

Mechanical Integrity Program Development

Recovery Boiler Natural Gas Conversion

Energy Monitoring Study-Steam Demand

Tissue Converting Dust Collection

Recovery Boiler Air Optimization Project

New Chip Thickness Screening System-Scope and Estimate

Tissue Machine Dry End Pulper Rebuild

New Polymer Modified Asphalt Unit

Concrete Repair Study and Recommendations

C-2030 Process Air Compressor and Building

Process Sealed Sewer Refurbishment

1250# Steam Header Engineering and Stress Analysis

Refinery Waste Water Treatment Plant Expansion Study / Detail

Fine Paper Machines Starch Systems-Scope and Estimate

Size Press Starch Cooker Replacement

New Vapor Destruction Unit

Urban Wood Handling Study

Chemical Waste Water Treatment Plant Expansion Study / Detail

Lime Kiln Burner Replacement & BMS Replacement

DMAPA Process De-Coupling

EPAM Reactor Addition

Breaker Addition

Flue Gas Cooler Replacement

New Chiller

Recovery Boiler Screen Tube Replacement

Recovery Boiler Floor, Front Wall, and Dissolving Tank Replacement

Safety Relief Valve Audit / Study (150 Valves)

Lighting System Upgrades Lowering Operational and Maintenance Costs

Tissue Machine - Vacuum Pick-up Box at Forming Roll

New Drilling Fluid Mud and Cement Plants

PARTIAL CLIENT LIST

Georgia-Pacific

KBR

RAYONIER Advanced Materials

kemira

WestRock

EVONIK INDUSTRIES

ENVIRON

CLEARWATER PAPER

PowerSouth ENERGY COOPERATIVE

INEOS

MITSUBISHI

outokumpu

ExxonMobil

CFIndustries

DAK Americas

EASTMAN

sabic

SOUTH MISSISSIPPI ELECTRIC

AkzoNobel

PCA PACKAGING CORPORATION OF AMERICA

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