





of historic structures.

Dynasty Group, Inc. is a professional engineering and land surveying firm that specializes in design engineering, construction engineering, surveying, nondestructive testing, and GIS support services. Since our founding in 1994, we have worked for public and private sector clients, providing comprehensive technical and administrative support in the design and construction of site and infrastructure systems. Our services can be applied to a broad range of project types, including highway, local roads, mass transit projects, the development of commercial, industrial, educational, medical and recreational facilities, the maintenance and expansion of municipal utility networks and facilities, and the preservation

The success of Dynasty Group is being built on the quality and professionalism of the work we produce. Our commitment to quality has been rewarded in the form of solid business relationships with many government agencies, consultants, contractors and private entities.

Dynasty Group is a certified Minority Business Enterprise (MBE) and Disadvantaged Business Enterprise (DBE).

Dynasty Group is pre-qualified with many public agencies, including the Illinois Department of Transportation, the Illinois State Toll Highway Authority and the City of Chicago.

SERVICES Design Engineering Surveying Construction Engineering Nondestructive Testing BIM/GIS Support

PROJECTS

Highways/Roadways Sewer and Water Systems Airports Public Transit Site Development Process Plants Roadway/Area Lighting Stormwater Management Historic Preservation Railroads Parks and Athletic Facilities Land Acquisition/Subdivision

Firm Overview









| Dynasty Grou |
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| Engineers & Surveyors |

Application of Services

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| | C | Design | i Engi | neerin | ng | Construction Engineering | | | | | Surveying | | | | | Nondestructive Testing | | | | | | | BIM/GIS Support | | | | | |
| | | | earch and | t t | | uo | culation J | | ering | VQC | | | | /ork | anning | etrating) | ulse V) | Testing | hear graphy | ponse | лу | ion | Control vey) | lced | esign and ion | O Models | n and ty | |
| Surveyors | Alignments | Geomatics | Utilities Rese Design | Storm Water Managemen | Lighting | Documentati | Quantity Cal and Tracking | Inspection | Field Engine | Materials Q∕ | Topographic | Construction | Land (Legal) | Control Netw | 3D Laser Sc | Ground-Pen Radar (GPR | Ultrasonic P Velocity (UP | Impact-Echo | Ultrasonic SI Wave Tomo | Impulse Res | Infrared Th <u>ermograp</u> | Data Collect | Dimensional (Control Sur | Geo-Referer Mapping | Database De Implementat | 2D/3D CADI | 3D Animatio Virtual Reali | |
| Transportation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Airports | | | | | | | | | | | • | | | | | | | | | | | • | | | | | | |
| Bridges | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Highways | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Public Transit Facilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Railroads | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Roadways & Streets | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Building and Site Development | - | | | | - | - | | | | | - | | | - | | - | | | | - | | | | - | | | | |
| Commercial Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Educational Facilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Healthcare Facilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Historical Documentation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Recreational Facilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Religious Facilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Residential Buildings | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Municipal Facilities | - | | | | - | - | | | | | - | | | - | | - | | | | - | | | | - | | | | |
| Public Utilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water Distribution/Sewer Systems | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water Treatment Plants | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Industrial Facilities | _ | | | | - | | | | | | - | | | - | | _ | | | | - | | | | - | | | | |
| Maintenance/Repair Shops | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Manufacturing Plants/Warehouses | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pharmaceutical Plants | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Process Plants | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Proje | ect exp | erienc | e ava | ilable | upon r | eques | st | | | | | | | | | | | | | | | | | | | |



Dynasty Group, Inc. provides design engineering services applicable to transportation systems, utility systems and site development projects. Our ability to provide comprehensive design engineering services comes from the successful assembly and integration of multiple engineering specialties into one resource, which affords clients the ability to fulfill all the needs of project design from one service provider.

Dynasty Group engineers are trained to keep the client's objectives foremost in their mind as they work through the creation of a design solution. They are cognizant that the development of any design is driven as much by the existing conditions of the site, the availability of supporting infrastructure, and the constructability of the proposed improvements as it is by the ultimate function of the facility. Our engineers, with the client, evaluate multiple design concepts before selecting the one best suited for the project, understanding that the option that is least expensive to construct may not necessarily be the right choice. The past application of design engineering services across a variety of project types means that our engineers have the experience necessary to achieve project objectives regardless of the obstacles encountered, such as permit requirements. Our managers and engineers are capable of quickly moving a project through the often lengthy regulatory approval process and on to the construction phase.

Dynasty Group's design engineering services can be applied to a broad range of project types, including highway, local roads and mass transit projects, the development of commercial, industrial, educational, medical and recreational facilities, the maintenance and expansion of municipal utility networks and facilities, and the preservation of historic structures.

SERVICES

Alignments/Geometrics Grading/Earthwork Utility Systems Storm Water Management Lighting Roadways/Pavements Specifications Permits Maintenance of Traffic

PROJECTS

Highways/Roadways Site Development Airports Transit Facilities Parking Lots Utility Systems Storm Water Management Systems Schools Parks/Athletic Fields Industrial Facilities

Design Engineering











Dynasty Group, Inc. provides construction engineering services that are applicable to a wide range of construction related activities. Our engineers perform typical construction engineering tasks, such as verifying compliance of constructed work with plans and specifications, reviewing product submittals and shop drawings, and calculating material quantities. We can also assist the project owner in managing their construction materials QA/QC program, reviewing and approving pay estimates and maintaining compliance with permit requirements.

Utilizing construction engineering services is beneficial to a project because it increases the quality of the constructed work, increases the safety of the people who construct and use the project, and enables accurate documentation of the built work. Through inspection of materials and observation of construction procedures, construction engineers help ensure that a project is built to meet the standards specified in the plans. Comprehensive documentation throughout construction creates a collection of information that repeatedly proves invaluable during the operation, maintenance, rehabilitation and expansion of a project. Above all, a properly built project can be used as intended without trepidation for the safety of the public.

Dynasty Group construction engineers are knowledgeable about and have completed training in construction related inspection and administration practices. By offering a full complement of construction engineering services, Dynasty Group can provide the client a continuous presence on the job site, from the first turn of the shovel to project closeout.

Dynasty Group is prequalified by the Illinois Department of Transportation in the specialization category of Construction Inspection.

SERVICES

Documentation Quantity Calculation Observation/Inspection Field Engineering Materials QA/QC Shop Drawing Review Pay Estimate Review Project Closeout

PROJECTS

Highways/Roadways/Bridges Intersections/Traffic Signals Site Development/Buildings Historic Preservation Airports/Transit Facilities Utility Systems Stormwater Management Systems Railroads

CONSTRUCTION ENGINEERING











SURVEYING

Dynasty Group, Inc. offers a full complement of surveying services for design and construction, including topographic, legal and construction surveys. These services can be applied to a wide range of project types and are scalable in size and complexity, from quarter acre lots to miles of highway and parking lots to process plant piping systems.

Topographic surveys are key instruments in the design and construction of projects and can be rendered useless if the data presented on them is incomplete or depicted inaccurately. When site features are correctly located on a survey, engineers can properly address them during project design. *Legal surveys*, used to define the boundary of property and right-of-way, require precise field work and thorough research of record documents in order for the land surveyor to establish accurate property lines. A plat of survey must illustrate in a clear and concise manner the boundary defined by the description and any encumbrances to the property. *Construction surveys* facilitate the construction of projects and documentation of their built condition. They translate the design from two-dimensional drawings to the real world, and are used to check the compliance of work with design specifications. They also document the location and quantity of materials used to construct the project.

Dynasty Group survey crews are experienced in the application of conventional and 3D laser scanning survey methods. Conventional methods are supplemented with laser scanning when project conditions require us to obtain high density amounts of data efficiently (piping systems), collect data safely in high hazard zones (highways), and collect data quickly in areas with limited access (airport runways).

Dynasty Group is prequalifed by the Illinois Department of Transportation in the specialization categories of Route Surveying and Land Surveying.





SERVICES

Topography Construction Legal (Boundary) Control Network 3D Laser Scanning

PROJECTS

Roadway & Streets Public Transit Facilities Bridges Railroads & Airports Industrial Facilities Historic Preservation

EQUIPMENT

Leica & Faro 3D Laser Scanners Leica GPS Systems Leica Total Stations Leica Automatic/Digital Levels TDS Ranger Data Collector Two-way Communication Radios



GLOBAL POSITIONING SYSTEM

Global Positioning System (GPS) is an integral part of today's surveying practice. From construction staking to GIS data collection, GPS is widely used in many areas. With the aid of Continuously Operating Reference Stations **(CORS)**, GPS technology has become a tool used to establish control networks, collect topographic features, monitor structure displacements, and provide construction references.

Dynasty Group, Inc. has more than ten years experience using GPS technology. Using various techniques, we tie most of our projects to the State Plane Coordinate System. For sizeable projects, our firm typically takes the hybrid approach to establish horizontal controls by using both GPS and total stations. The observations collected with both technologies are analyzed and adjusted simultaneously so that the same order of accuracy is achieved among all prime controls for the project, regardless of which device was chosen to occupy a control point.

Understanding GPS technology is the key to a complete and successful project. A surveyor must possess certain knowledge and experience, from GDOP to project planes, from grid coordinate to ground coordinate, and from fast-static to real-time kinematic GPS surveys in order to deliver sound results. Moreover, it's also important to understand the areas of the technology being applied. For example, most construction is performed on the ground and layout crews will take measurements on the surface of earth. Therefore, it is critical to note if the published GPS coordinates are projected on the ground or at grid level. Projection on the ground or to the grid level, in conjunction with US survey foot or international foot, is another area where mistakes often occur when using GPS technology in surveying.

Combining GPS technology with total stations, 3D Laser Scanners and/or Laser Rangers, numerous innovative techniques can be utilized for efficient and accurate data collection tasks.

Dynasty Group, Inc. has the latest Leica GPS equipment and they can be configured in many ways to satisfy the needs of any project. The data collected is analyzed in Leica Geo-Office or Star Net software.







3D LASER **S**CANNING

3D Laser Scanning is a technology that captures real scenery into a 3D virtual word. This technology has been widely used in reverse engineering and quality inspection. The application of this technology on large objects, such as buildings and bridges, provides a whole new perspective to surveying and data collection.

Since 2001, Dynasty Group, Inc. has been researching and applying this technology on many architectural and engineering projects. With our strong background in surveying, the firm has successfully used 3D Laser Scanning Technology in the following areas:

- Transportation Engineering
- Building and Site Development/Historic Documentation
- Municipal Facilities
- Industrial Plants

3D Laser Scanning Technology uses Laser Triangulation, a precise method of 3D data acquisition. A laser beam is deflected from a mirror onto the scanning object. The object scatters the light, which is then collected by a sensor located at a known triangulation distance from the laser. Using trigonometry, 3D spatial (XYZ) coordinates of surface points are calculated. With motors rotating the scanner horizontally and the mirror vertically, the 3D laser scanner records thousands of points per second. This is referred to as a point cloud.

There are many challenges is using 3D Laser Scanning Technology on large objects. One of them is the ability to register the scans together. To scan a building, it usually takes several scans to several hundred scans to cover the project area. The accuracy of each scan is limited by the type of scanner, usually dictated by the manufacturer. However, the accuracy of the whole project depends on the operators' proficiency in collecting and processing the data.

Dynasty Group, Inc. has established its leading position in providing 3D Laser Scanning services. This is not only based on our knowledge and experience in 3D Laser Scanning, but also on our expertise in architecture, engineering, building information modeling, and the innovative approach we take to manage our projects.









Nondestructive Testing

Dynasty Group, Inc. offers nondestructive testing (NDT) of structures and infrastructure to assist our clients in an array of applications including: condition assessment of structures, delineating the extent of damage of faulty construction, determining the conformity of plans and specifications, load-rating and structural analyses, and forensic criminal investigations. Our firm employs a broad range of NDT methods as an integral part of forensic investigations of concrete structures and construction engineering services.

The success of any NDT investigation begins with understanding the underlying problem and determining the appropriate NDT approach to arrive at a comprehensive solution.

Dynasty Group utilizes a full spectrum of NDT evaluation methods and applies them to a variety of assignments. Using NDT techniques, our engineers have investigated construction materials such as concrete, masonry, stone, wood and steel. Our NDT engineers have been developing and refining the applications of NDT to assist a wide range of clients, which include: government agencies, law enforcement, owners, engineers, contractors, and researchers. Our NDT capabilities have been developed from a thorough understanding of the technology employed and the experience gained through a broad range of field assignments.

EVALUATION METHODS

Ultrasonic Shear Wave Tomography (UST) Ground-Penetrating Radar (GPR) Impact-Echo Testing (IE) Impulse Response Testing (IRT) Infrared Thermography (IR) Ultrasonic Pulse Velocity (UPV) Electromagnetic Covermeter (Metal Detectors) Schmidt Hammer (Rebound Hammer) Sounding (Hammer and Chain Dragging) Visual Inspection and Condition Assessment Corrosion Assessment

- Half-Cell Potential
- Depth of Carbonation Test

PROJECTS

Bridges Sports Arenas Roads & Streets Highways Parking Garages High-Rise Buildings Historic Preservation Residential Buildings Commercial Buildings











GROUND-PENETRATING RADAR (GPR)

OVERVIEW

Ground penetrating radar is a nondestructive test method, which involves the transmission and reflection of electromagnetic waves into the structure or material. The principal of surface penetrating or ground penetrating radar is analogous to pulse echo ultrasonic techniques, except that it uses electromagnetic instead of acoustic waves.

APPLICATIONS

The GPR test method is commonly used to: estimate the thickness of concrete members and multi-layer systems, locate embedded reinforcement and underground utilities, measure concrete cover thickness, locate moisture variations, locate voids and delineate its size, locate honeycombing, cracking, and delaminations in concrete.

GPR is also used to investigate other construction materials such as stone and masonry. It is very effective in determining the grout conditions of CMU wall systems.

BENEFITS

- One-sided method
- Continuous collection of the data
- Portable system
- Produce 3D views of processed data
- No risk of radiation
- In some cases, data can be collected with vehicle-mounted antennas













ULTRASONIC SHEAR WAVE TOMOGRAPHY

OVERVIEW

The Ultrasonic Shear Wave Test Method (UST), commercially known as A1040 Polygon, is a concrete flaw detection system capable of generating 3-D tomographic images of concrete elements. The basic system consists of a console with forty transducers configured in ten rows of single modules containing four Shear wave transducers each. The transducers are spring-loaded, dry-point contact (DPC) piezoelectric sensors with a center frequency of 50 kHz. Each transducer is built with a wear-resistant ceramic tip, which allows testing even on very rough surfaces.



METHODOLOGY

Once the ultrasonic shear wave signal is emitted, the received signals are processed by the controlling console and then transferred to a laptop computer via Wi-Fi wireless technology for further analysis by proprietary software. A synthetic aperture focusing technique (SAFT) data processing method is then performed to generate the 3-D images of the concrete element. The reconstructed images are displayed almost instantaneously on the computer screen as a plan view, cross-section, or isometric view. Images are generated from the signals received from all the combinations of PDC transducers (transmitting and receiving) in the antenna array.

APPLICATION

The Polygon system is commonly used in concrete, stone, and masonry structures to detect internal flaws such as delaminations, cracks, and poorly-consolidated or honeycombed concrete, as well as voids in grouted tendon ducts systems.







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INFRARED THERMOGRAPHY

OVERVIEW

The Infrared Thermography (IR) Test Method is a nondestructive test method that uses infrared cameras. IR cameras produce visual images of the thermal signature of structures by sensing and interpreting the emission of thermal radiation and visually portraying temperature gradients as small as 0.05°C. The IR Test Method can instantly detect subsurface anomalies within and below concrete elements.

METHODOLOGY

Infrared is the invisible portion of the light spectrum extending from 0.75 to 1000 microns. All objects warmer than absolute zero (0 Kelvin or -275.15°C) emit energy somewhere within that range. The warmer the object, the brighter it appears in the thermal camera. White is hotter, black is colder. IR doesn't measure directly the temperature; instead it detects the energy gradient as heat radiates or flows from one place or object to another. Temperature is a property of matter and not a measurement of internal energy. It defines the direction of heat flow when another temperature is known. Heat always flows from the object that is at the higher temperature to the object that is at the lower temperature.





APPLICATIONS

The Infrared Thermography Test Method can be used to detect anomalies in surface radiance that may be related to subsurface condition of the concrete member. IR is commonly used in concrete, stone, and masonry structures to detect internal flaws such as delaminations, cracks, and poorly-consolidated or honeycombed concrete. IR has also been extensively used to conduct moisture surveys for roofing, for water infiltration in EIFS and building facades, to detect the presence of grouted cells in CMU, to detect air blisters and crack propagation in FRP strengthened concrete elements, to detect delaminations in concrete decks and overlays, and in numerous other applications, and fields.











BIM/GIS SUPPORT

Dynasty Group, Inc. offers support services for Building Information Modeling (BIM) and Geographic Information System (GIS) developments. *Information is power*. BIM and GIS systems bear essential information to make sound decisions. Accurate information comes from reliable data and its derivatives.

Data collection is one of the most important tasks in developing BIM and/or GIS systems. The data usually includes spatial data and attribute data. Spatial data is typically collected with various tools of measurement, i.e., tape, GPS, total station, 3D laser scanner, hand-held scanner and laser tracker. Dimensional control (control surveying) method is critical to registering all measurements into one uniform coordinate system. For some projects, large data set is often segmented into smaller sets in order for a computer system to process. Dimensional control provides the spatial relationship among the segmented data sets. Moreover, dimensional control also provides the means to geo-reference the project to any established grid, such as latitude and longitude, state plane coordinate system and sectionalized land system.

Attribute data is the "intelligence" of BIM/GIS systems. By associating attribute data, such as cost, service life, and current condition of building components to 2D/3D objects, the "smart" model becomes valuable information to be used in facility management, planning and construction. Attribute data is collected through record research, interviewing with experienced personnel and direct observation. After being collected, attribute data needs to be reduced, analyzed and organized before it can be used to populate databases and be associated with spatial objects.

The right tools can only be effective in the capable hands. The engineers, surveyors and technical staff at Dynasty Group are experienced in collecting and manipulating data and generating useful information through many techniques to support the development of fully functional BIM and GIS systems.

SERVICES

Data Collection Dimensional Control Geo-referenced Mapping Sectionalized Land System Database Design and Implementation 2D Drawings and 3D Solid Models 3D Animation and Virtual Reality

PROJECTS

Public Transit Facilities Educational Facilities Airports Industrial Facilities Water Treatment Plants Highways Historic Preservation









CLIENT LIST

Public Agencies

City of Chicago Department of Aviation - O'Hare Modernization Program **Department of Community Development Department of General Services** Department of Transportation **Department of Water Management** Cook County **Highway Department** Forest Preserve District **DuPage County Department of Transportation Forest Preserve District** Storm water Management Kane County Department of Transportation Chicago Housing Authority **Chicago Park District Chicago Public Schools** Chicago Transit Authority City of Evanston **City of Naperville** CSX Corporation, Inc. Illinois Department of Transportation Illinois State Toll Highway Authority Metra Railways Metropolitan Water Reclamation District of Greater Chicago Town of Cicero Village of Bellwood Village of Deerfield Village of Franklin Park Village of Glendale Heights Village of Glenview Village of Olympia Fields Village of Sauk Village Village of Woodridge Village of Winnetka

Private Clients

Advocate Christ Medical Center Advocate Hope Children's Hospital Advocate Illinois Masonic Medical Center Allied First bank Beacon Hill Belmont Bank and Trust BitWyse Solutions, Inc. BP Products North America, Inc. **Breakthrough Urban Ministries Burling Builders** Chili's Citigroup Dat Donut Edward Hospital Fifth Third Bank First Evangelical Free Church Fluor Enterprises, Inc. Freedom Temple Full Gospel Christian Assembly Harbour View Condominiums Heritage Property Investment Trust Illinois Institute of Technology Illinois Masonic Medical Center Iron Mountain Jacobs Engineering Loyola Medical Center Lutheran General Hospital Maggiano's Marion Hill Company Murphy's Bleachers Northwestern University The Shiner Group, LLC **Urban Retail Properties** Victory Apostolic Church Walsh Group