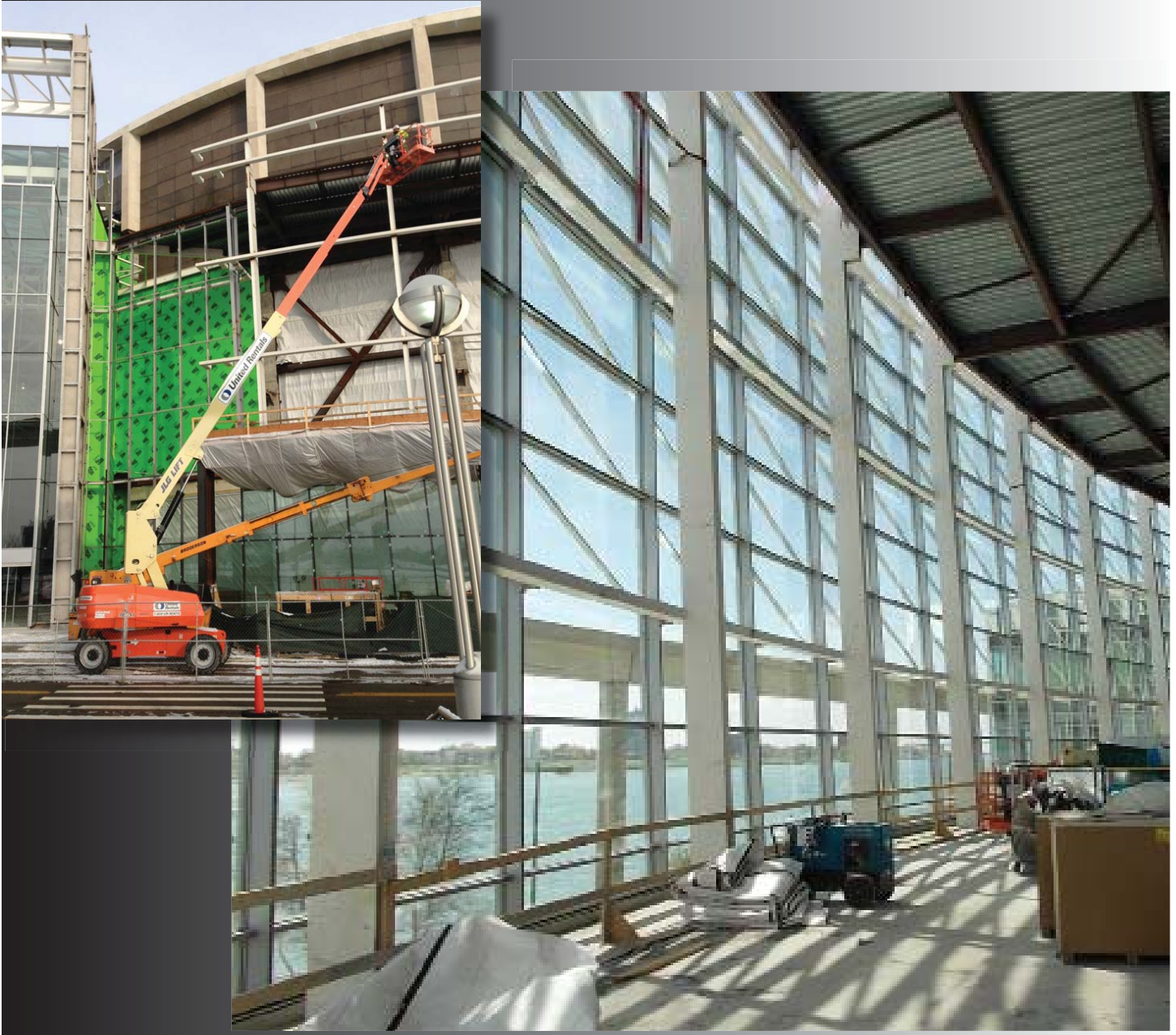




SPALDING DeDECKER ASSOCIATES, INC.

Surveying Specialty

# Layout for Industrial and Heavy Civil Projects





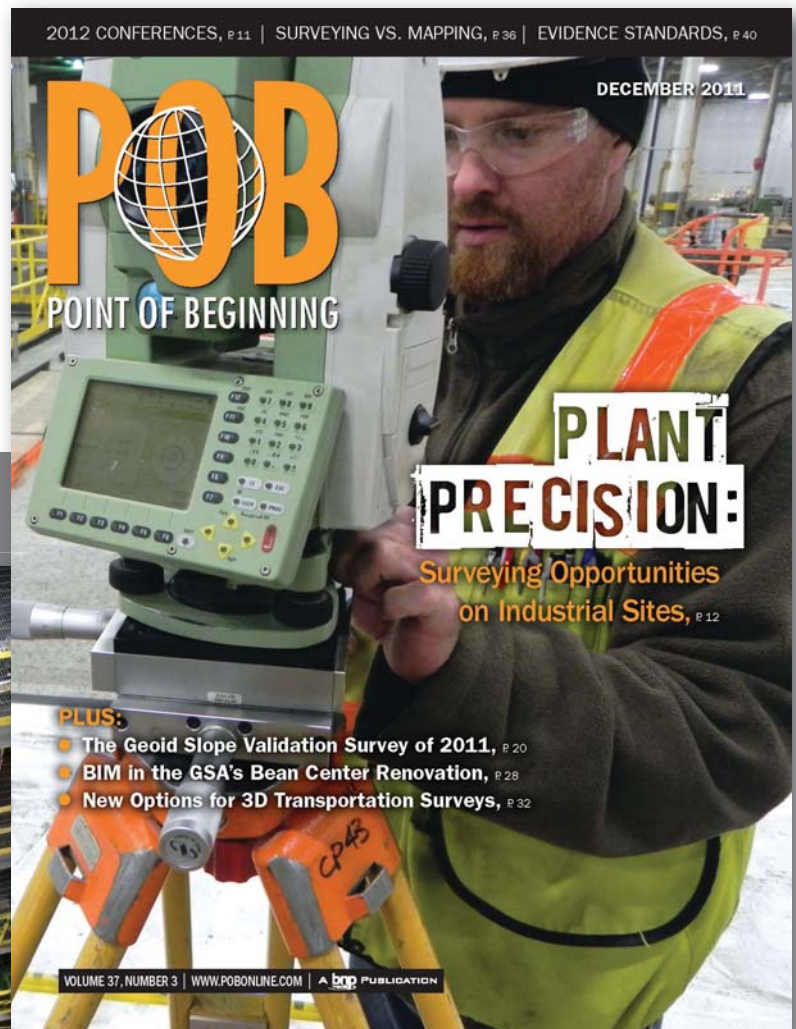
## Industrial Surveying

### Overview

Industrial surveying is sometimes used to describe the precise alignment of industrial machining or equipment and is also sometimes termed "optical tooling." Although some overlap exists between this process and traditional surveying techniques, SDA primarily focuses on the precise surveying layout work that is required to set the foundation for a project before the millwrights, boilermakers, machine installers or toolmakers take over to perform the final measurements and installation. In these types of applications, surveyors are often followed by other professionals who use tilting levels, laser trackers, and other measurements to achieve sub-millimeter accuracy.

Projects for manufacturing plants, steel mills, refineries, and power plants comprise the bulk of our industrial work. Owners include automotive companies and suppliers, defense manufacturers, energy producers, and steel makers. Services involve providing layout for installing process line support steel in existing facilities; setting control for process or assembly lines; layout for piles, footings, piers, foundations, and anchor bolts for new construction; layout for architectural metal or screen-wall assembly for buildings; anchor-bolt and steel-erection surveys; crane rails surveys; coal volume surveys; and verification and as-built surveys. The common thread between these projects is the large scale of the construction, the exacting tolerances required, and the relative complexity of the projects and plans.

Industrial sites require stringent safety practices, exacting tolerances, and attention to detail.



*Spalding DeDecker's Industrial Surveying practice was featured as the cover story for Point of Beginning (POB) magazine, a national publication for the surveying industry.*

*SDA crews performed extensive layout and as-built measurements, on a new blast furnace at the former Rouge Steel site, including the check of each irregular-shaped piece of the assembly to extremely tight tolerances.*





## Industrial Surveying



Spalding DeDecker Associates, Inc. (SDA) has performed several different types of projects across the United States. Some of the services we have provided include:

### Architectural Metal and Screen Wall Layout

Modern building construction often includes a structural steel framework to support the building and a modular screen wall to encapsulate the structure and provide architectural highlights. Precise layout is required to assure that the various panels are plumb and aligned in all planes. Alternating windows and building panels typically leave very little room for error, with little allowance provided for variations in spacing. Because line of sight from one panel to the next is an aesthetic issue, it is critical that all joint lines are precisely aligned. All of this demands precise, exacting tolerances for surveying layout and specialized techniques.

SDA is experienced in working on projects with a variety of construction elements, including architectural metal, glass, pre-manufactured panels, and other details.

### Layout for Plant Process Lines

Process equipment such as paint lines within a paint shop require support steel located along the line. This support steel is typically attached to the concrete plant floor by drilling holes and setting quick-set bolts or anchoring the bolts with epoxy. This task typically requires the precise layout for dozens of columns and hundreds of individual bolts.

### Coal Volume Surveys

Power plant operators require accurate volume surveys on a regular basis in order to confirm their usage computations versus their delivery records and actual remaining volumes. Because the volume of coal varies greatly depending on the type, source, and method of stockpiling, reconciling the calculations can be a challenge and having accurate measurements is critical.

SDA is able to use conventional surveying measurements, laser scanning, or automated methods to accurately compute coal stockpile volumes.

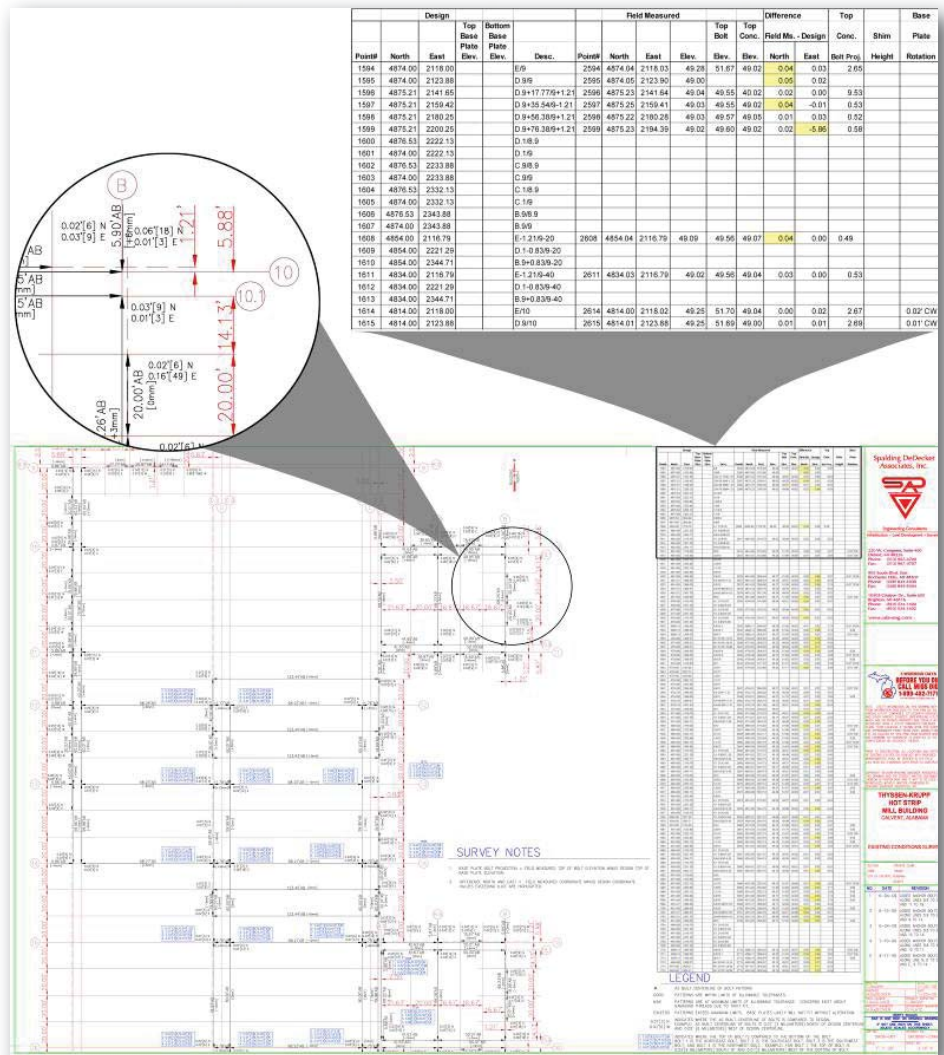


## Industrial Surveying

### Anchor Bolt As-Built Measurements and Drawings

As-built surveys of anchor bolts are typically requested prior to beginning steel-erection. These surveys are critical to spotting problems while there is time to make corrections. Correcting these problems in advance helps to avoid costly down time and scheduling issues during the steel-erection process.

SDA typically verifies furnished site control and locates the centerline of each bolt pattern. We then calculate the offset of the as-built column in relation to the proposed centerline, the measured distance between bolt patterns, the bolt projection, and the top of concrete elevation. Additional measurements can be made to determine the orientation of the bolt patterns to determine if they are skewed in relation to the column lines. For larger bolt patterns, templates can be made for a test fit of bolts to spot problems early on if bolts are leaning or incorrectly spaced. Results are typically presented in a drawing and spreadsheet format.





## Industrial Surveying

### Layout and As-Built Locations for Crane Rail

Crane rail installation typically requires exacting specifications for horizontal and vertical alignment. SDA provides layout, as well as as-built measurements and drawings to support this precise work. Depending on the type of system installed, this critical work may begin with assistance in installing the support columns and crane girders. SDA provides reports relative to standards of the Crane Manufacturer's Association of America (CMAA) for rail span, straightness, elevation, and eccentricity. This includes evaluating direct measurements as well as the rate of change.

### Supplemental Layout for Steel Erection

Supplemental layout may include establishing the bottom of base plate elevations by setting shims or setting one leveling nut to the proposed elevation. For structural steel that requires precise alignment, we have also provided assistance in plumbing individual columns. In some applications we have also provided horizontal and vertical alignment for crane girders. All these steps are critical for the final crane rail installation, assuring that proper eccentricity is achieved, meaning that the rail is centered on the crane girder.

Hot Strip Mill - Runway #7 Crane Rail Spans											
Between Columns: 15.1 & 15.9											
CMAA Allowable Span Tolerance: 0.25"											
CMAA Maximum Rate of Change: 0.25" in 20', 0.260" in 20.81' or 0.313" in 25'											
Column Spacing: 41.625 & 50 ft. Design Rail Span: 68.25 ft.											
Column No.	Design Span (in.)	Measured Span (in.)	Difference (in.)	Span Out of Tolerance	Rate of Change Out of Tolerance	Column No.	Design Span (in.)	Measured Span (in.)	Difference (in.)	Span Out of Tolerance	Rate of Change Out of Tolerance
B	819.00	819.976	-0.024	no	no						
Mid	819.00	818.780	-0.221	no	no						
B.5	819.00	818.819	-0.181	no	no						
Mid	819.00	818.819	-0.181	no	no						
B.8	819.00	818.858	-0.142	no	no						
Hot Strip Mill - Runway #7 Crane Rail Straightness											
Columns: 15.1 & 15.9											
CMAA Allowable Rail Straightness: +/-0.375"											
CMAA Maximum Rate of Change: 0.25" in 20', 0.260" in 20.81' or 0.313" in 25'											
Column Spacing: 41.625 & 50 ft. Design Rail Span: 68.25 ft.											
Column No.	Baseline to Inside Flange Offset (in.)	Baseline Offset (in.)	Rail Straightness (in.)	Rail Straightness Out of Tol.	Rate of Change Out of Tol.	Column No.	Baseline to Inside Flange Offset (in.)	Baseline Offset (in.)	Rail Straightness (in.)	Rail Straightness Out of Tol.	Rate of Change Out of Tol.
B	12	12.031	-0.031	no	no						
Mid	12	11.719	0.281	no	no						
B.5	12	11.719	0.281	no	no						
Mid	12	11.781	0.219	no	no						
B.8	12	11.656	0.344	no	no						
Hot Strip Mill - Runway #7 Rail To Rail Elevation											
Between Columns: 15.1 & 15.9											
CMAA Rail Elevation Tolerance: +/-0.375"											
CMAA Maximum Rate of Change: 0.25" in 20', 0.260" in 20.81' or 0.313" in 25'											
CMAA Rail to Rail Elevation Tolerance: +/-0.250"											
CMAA Rail to Rail Elevation Rate of Change: 0.26" in 20', 0.260" in 20.81' or 0.313" in 25'											
Column Spacing: 41.625 & 50 ft. Design Rail Span: 68.25 ft.											
Column No.	Design Elevation (in.)	Measured Elevation (in.)	Difference (in.)	Rail Elevation Out of Tolerance	Rate of Change Out of Tolerance	Column No.	Design Elevation (in.)	Measured Elevation (in.)	Difference (in.)	Rail Elevation Out of Tolerance	Rate of Change Out of Tolerance
B	39.557	39.555	-0.002	no	no						
Mid	39.557	39.555	-0.002	no	no						
B.5	39.557	39.561	0.004	no	no						
Mid	39.557	39.555	-0.002	no	no						
B.8	39.557	39.565	0.008	no	no						
Hot Strip Mill - Runway #7 Rail Eccentricity											
Columns: 15.1 & 15.9											
Crane Rail Flange Width: 5.188"											
Web Thickness: 0.625"											
Allowable Rail Eccentricity: .34 x Girth Web Thickness +/-0.4686"											
Column No.	Beam	o/s to Flange (in.)	o/s to Web (in.)	o/s to Rail (in.)	Rail Eccentric (in.)	Column No.	Beam	o/s to Flange (in.)	o/s to Web (in.)	o/s to Rail (in.)	Rail Eccentric (in.)
B	Begin	11.963	11.875	9.438	12.031	0.198					
Mid	11.315	11.625	9.125	11.719	0.094						
End	11.375	11.688	9.125	11.719	0.031						
B.5	Begin	11.625	11.038	9.125	11.719	-0.219					
Mid	11.750	12.063	9.188	11.781	-0.281						
End	11.813	12.125	9.063	11.656	-0.469						
B.8											
Hot Strip Mill - Runway #7 Summary Columns 15.1 and 15.9 from Column B to B.8											
Column Spacing: 41.625 & 50 ft. Rail Span: 68.25'											
Item		Out of Tolerance									
Rail Span		All measurements are within allowable tolerances									
Span Tol.: +/-0.250"											
Max Rate of Change: 0.313" in 25'											
Rail Straightness		All measurements are within allowable tolerances									
Straightness: +/-0.375"											
Max Rate of Change: 0.313" in 25'											
Rail Elevation		All measurements are within allowable tolerances									
Rail Elevation: +/-0.375"											
Max Rate of Change: 0.313" in 25'											
Rail to Rail Elevation: +/-0.250"											
Max Rate of Change: 0.313" in 25'											
Rail Eccentricity		All measurements are within allowable tolerances									
Eccentricity: +/-0.4686"											





## Industrial Surveying

Following is a partial list of industrial projects we have performed throughout the United States:

**Ford Wayne Stamping Press Line #5 Building Addition**

Wayne, Michigan  
January 2012 - February 2012  
(SDA Job No. SM12-007)

**GM Fort Wayne Assembly Plant**

Fort Wayne, Indiana  
October 2011 - November 2011  
(SDA Job No. SM11-055)

**Bell Building**

Detroit, Michigan  
August 2011 - September 2011  
(SDA Job No. SM11-044)

**GM Pontiac Press Upgrade**

Pontiac, Michigan  
August 2011 - December 2011  
(SDA Job No. SM11-042)

**Chrysler Trenton Engine Plant**

Trenton, Michigan  
July 2011 - August 2011  
(SDA Job No. SM11-041)

**Chrysler Sterling Heights Assembly Plant (SHAP) Paint Shop**

Sterling Heights, Michigan  
July 2011 - October 2011  
(SDA Job No. SM11-038 / SM11-059)

**DTE Energy**

Monroe, Michigan  
March 2011 - December 2011  
(SDA Job No. SM11-014 / SM11-031)

**DTE FERMI**

Monroe, Michigan  
May 2011 - August 2011  
(SDA Job No. SM11-022)

**Cobo Center**

Detroit, Michigan  
April 2011 - May 2011  
(SDA Job No. SM11-017 / SM11-004)

**General Motors New Topcoat Lines**

Lake Orion, Michigan  
April 2011 - July 2011  
(SDA Job No. SM11-014)

**Severstal NA Cold Rolling Mill**

Dearborn, Michigan  
March 2011 - December 2011  
(SDA Job No. SM11-013)

**Marathon Detroit Refinery DHOUP**

Detroit, Michigan  
March 2011 - December 2011  
(SDA Job No. SM11-012)

**Northrop Grumman Shipbuilding SMOF Building**

Newport News, Virginia  
February 2011 - October 2011  
(SDA Job No. SM11-005)

**Severstal Galvanizing Line**

Dearborn, Michigan  
July 2010 - January 2011  
(SDA Job No. SM10-039)

**GM Flint Stamping Press Upgrade**

Flint, Michigan  
November 2009 - August 2010  
(SDA Job No. SM09-048 / SM09-053)

**Lockheed Martin Aeronautics**

Fort Worth, Texas  
October 2009 - December 2009  
(SDA Job No. SM09-042)

**Thyssen-Krupp New Steel Plant**

Calvert, Alabama  
September 2008 - July 2010  
(SDA Job No. SM08-061)

**Troy Beaumont Pedestrian Bridge**

Troy, Michigan  
August 2008 - January 2009  
(SDA Job No. SM08-055)

**National Alabama Railcar**

Cherokee, Alabama  
July 2008 - August 2008  
(SDA Job No. SM08-045)

**BMW Paint Shop**

Spartanburg, South Carolina  
April 2008 - July 2008  
(SDA Job No. SM08-025)

**BASF**

Wyandotte, Michigan  
February 2008 - May 2008  
(SDA Job No. SM08-009)

**Dearborn CSO Contract No. 8**

Dearborn, Michigan  
December 2007 - September 2011  
(SDA Job No. SM07-112)

**GETRAG Tequila Transmission Plant**

Tipton, Indiana  
August 2007 - November 2007  
(SDA Job No. SM07-088)

**Severstal Blast Furnace "C" Stoves**

Dearborn, Michigan  
July 2007 - February 2008  
(SDA Job No. SM07-082)

**Honda P2M-F Assembly Plant (Paint Shop)**

Greensburg, Indiana  
August 2006 - February 2007  
(SDA Job No. SM07-013.0C)

**Honda P2M-F Assembly Plant**

Greensburg, Indiana  
August 2006 - February 2007  
(SDA Job No. SM07-013)

**Severstal Blast Furnace "B" Rebuild**

Dearborn, Michigan  
January 2008 - July 2008  
(SDA Job No. SM07-008)



## Industrial Surveying

**Honda Engine Plant 2PX**

Anna, Ohio  
August 2006 - February 2007  
(SDA Job No. SM06-106)

**DTE Energy**

Detroit, Michigan  
July 2006  
(SDA Job No. SM06-085)

**Severstal Blast Furnace "C" Rebuild**

Dearborn, Michigan  
March 2006 - October 2007  
(SDA Job No. SM06-034)

**GM Lansing ASRS Building**

Delta Township, Michigan  
October 2005 - May 2006  
(SDA Job No. SM05-157)

**Bodine Aluminum**

Jackson, Tennessee  
August 2005 - November 2005  
(SDA Job No. SM05-123)

**Wyandotte Power Plant Coal Volumes**

Wyandotte, Michigan  
2001 - Present

**Daimler Chrysler Dodge City**

Warren, Michigan  
October 1999  
(SDA Job No. SM99-061)

**Chrysler Office Building**

Auburn Hills, Michigan  
December 1998  
(SDA Job No. SM98-088)



# SPALDING DeDECKER ASSOCIATES, INC.

## SERVICES



### Survey & Mapping

Speed and technical accuracy are the cornerstones of Spalding DeDecker Associates, Inc.'s (SDA) survey and mapping services. Our licensed survey professionals can oversee more than 25 crews daily to accommodate any project's complex and stringent requirements. Most of our field and office staff are Certified Survey Technicians. By electronically converting site data, we quickly and accurately collect the necessary data. Using state-of-the-art equipment, including a Leica 1203 TCRP robotic total station, a Trimble R8 GPS receiver, or a digital level, our surveyors provide construction layout or collect data quickly and efficiently.



#### Services

- Aerial Control Surveys
- ALTA / ACSM Land Title Surveys
- Anchor Bolt Surveys
- Aviation / Airfields
- Boundary Surveys
- Column Line Layout
- Condominium Exhibit B Documents
- Construction Staking
- Crane Rail Surveys
- Easement Documentation
- Elevation Certificates / LOMA's
- Floodplain Surveys
- GPS Rental & Training
- Industrial Surveying
- Laser Scanning
- Mortgage Surveys
- Oil & Gas Pipeline Surveys
- Parcel Splits
- Remonumentation Programs
- Right-of-Way Surveys
- Site Feasibility Studies
- Stockpile Quantities
- Subdivision Platting
- Subsidence Monitoring
- Topographical Surveys
- Tree Surveys
- Tunnel Surveying
- Utility Surveys
- Wetland Delineation Surveys







# SPALDING DeDECKER ASSOCIATES, INC.



Established in 1954, Spalding DeDecker Associates, Inc. (SDA) is an employee-owned consulting engineering firm specializing in infrastructure, land development, and surveying. With offices in Detroit, Rochester Hills, and San Antonio, and multiple field offices, SDA offers a diverse core of engineering services for municipal, land development, transportation, and water / wastewater projects. The firm also offers complete construction engineering, landscape architectural, pavement management, and land surveying & mapping services.

## offices

### Headquarters - Rochester Hills

905 South Blvd. East  
Rochester Hills, Michigan 48307  
phone (248) 844-5400  
fax (248) 844-5404

### San Antonio

9120 Old Dietz Elkhorn Road  
San Antonio, TX 78015  
phone (830) 755-8434  
fax (830) 755-8435

### Cleveland

5555 Canal Rd.  
Cleveland, Ohio 44125  
phone (216) 789-0748

### Detroit

1435 Randolph St., Suite 400  
Detroit, Michigan 48226  
phone (313) 967-4700  
fax (313) 967-4707

### Livonia

39293 Plymouth Rd., Suite 102  
Livonia, Michigan 48150  
phone (734) 293-5200  
fax (734) 293-5202

## website

[www.sda-eng.com](http://www.sda-eng.com)

## facebook / LinkedIn

[www.facebook.com/SpaldingDeDeckerAssociatesInc](http://www.facebook.com/SpaldingDeDeckerAssociatesInc)  
[www.linkedin.com/company/spalding-dedecker-associates-inc](http://www.linkedin.com/company/spalding-dedecker-associates-inc)

## directors / officers

**President** Steve E. Benedettini

**Chairman** George M. Platz, PS  
Catherine M. DeDecker, PS

Michael F. H. DeDecker, PS

Thomas J. Dohr, PE  
Cheryl L. Gregory, PE

Thomas J. Sovel, PE

## professional staff (licensed in multiple states)

- Professional Engineers
- Professional Surveyors
- Registered Landscape Architects

## technical staff

- ACSM Certified Survey Technicians
- Certified Floodplain Managers
- Certified Public Infrastructure Inspector
- Confined Space Entry & Attendants
- Construction Documents Technologist
- MicroStation & AutoCAD Technicians
- O&M Technicians
- OSHA HAZWOPER 40 Hour Training
- Red Cross - CPR, AED, & First Aid
- Safe2Work Safety Training

### MDOT Technician Training:

- Concrete Inspection
- Bituminous Inspection
- Aggregate Technician
- Density Technology
- Bridge Inspection
- Computerized Office Technician
- FieldManager / FieldBook

### MDEQ:

- Stormwater Management Operator - Construction Site & Industrial Site
- Soil Erosion and Sedimentation Control
- Drinking Water S-3
- Waste Water S-1

**100% Employee-Owned | ISO 9001-2008 Based for Quality | MUST Certified for Drug Compliance**