

Fabricated Metal Products Manufacturing

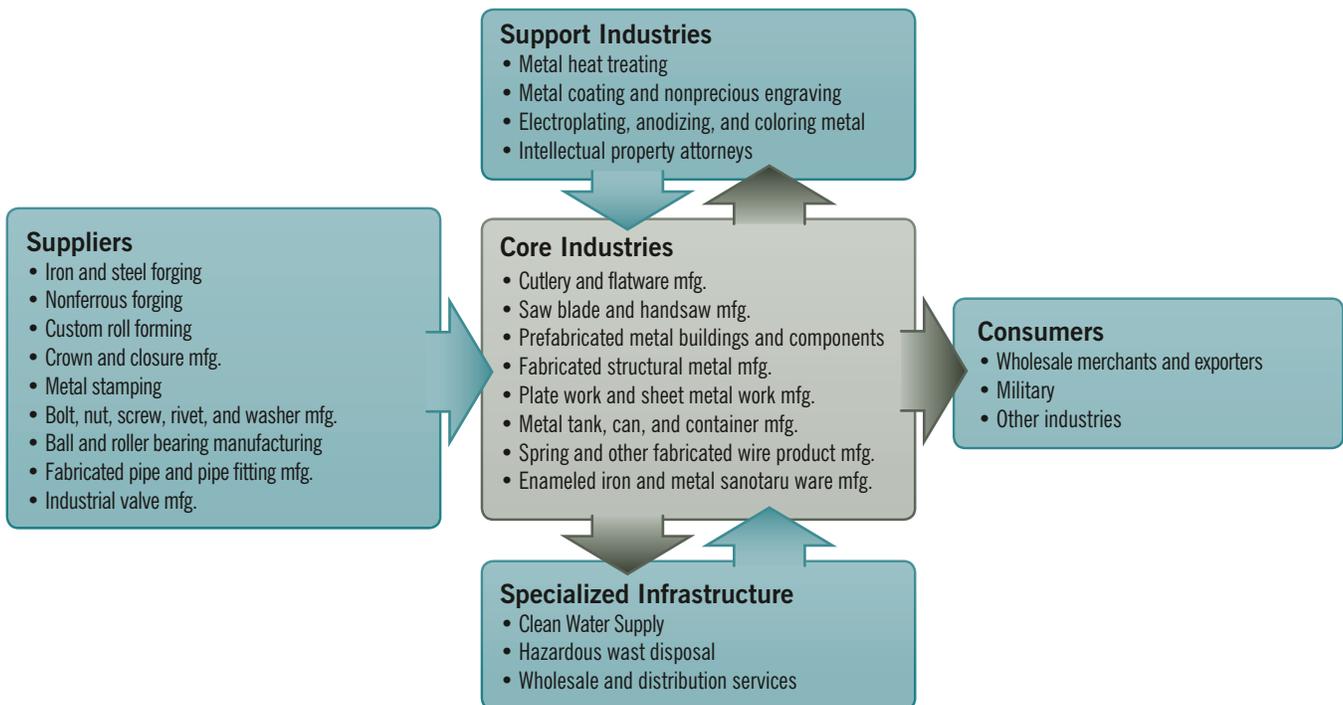
CLUSTER SUMMARY

The *Fabricated Metal Products Manufacturing* industry cluster transforms purchased metals into intermediate or end-use products through forging, stamping, bending, forming, welding, machining, and/or assembly. Because of the specialized processes involved for individual parts, most companies make a limited range of products. Major segments of the Fabricated Metal Products industry cluster include architectural and structural products; forging and stamping; machining; cutlery, tools, and kitchenware; boilers, tanks, and containers; hardware; springs and wires; coating, plating, and polishing; and valve and pipe manufacturing. The five-county region, as well as the surrounding metro area, has a strong and well-established presence in these industries, and many products or components supply other important industries in the Region, such as motor vehicles, aerospace industrial machinery, and appliance manufacturing.

CLUSTER DEFINITION

An industry cluster is a group of similar industries which are closely connected by supply chains and/or similar labor pools located within the same region. The core strength of the Fabricated Metal Products Manufacturing industry cluster comes from the production of tools, structural components, and parts which are either sold as finished products or are incorporated into other manufactured goods. These core industries drive employment and inputs in other industries which supply them (e.g., metal forging, forming or stamping, crown, closure, fastener, and valve manufacturing), as well as those which support the core industries by providing business finance and industrial process services (Figure 1).

Figure 1: Fabricated Metal Products Manufacturing, Cluster Components



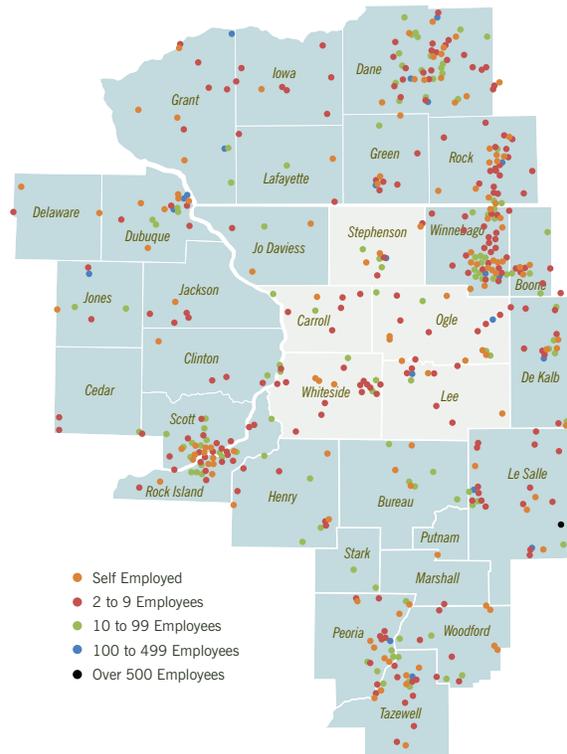
Source: The Purdue Center for Regional Development (cluster definitions), 2012.

REGIONAL OVERVIEW

The Fabricated Metal Products Manufacturing cluster in the Reference Region, a group of 32 counties in northwest Illinois, northeast Iowa, and southwest Wisconsin which includes the five-county region, had 806 establishments in 2010 and employed 20,796 people. The majority of businesses in this cluster are small in terms of employment (63.0% of firms have fewer than 10 employees) with the few large employers concentrated in the metropolitan areas (Figure 2).

The cluster also has had a consistently higher average, but declining, concentration of employment in the five-county region with location quotients (LQ) of 4.7 in 2001, 4.0 in 2007, and 3.8 in 2010. Not all of the industries in the cluster are represented in the five-county region, and some have a weak presence. There are 14 industry subsectors in the cluster which have a strong presence in the Region based on concentration of employment (Figure 3).

Figure 2: Fabricated Metal Products Manufacturing: Firms in the by Employment Size Category



Source: DecisionData.net, 2011.

Figure 3: Fabricated Metal Products Manufacturing: Subsectors Based on Employment Concentration

Indicator	Location Quotient (2010)
Crown and closure manufacturing and metal stamping	21.6
Plumbing fixture fitting and trim manufacturing	7.7
All other forging, stamping, and sintering	5.9
Ornamental and architectural metal products manufacturing	5.1
Turned product and screw, nut, and bolt manufacturing	4.8
Ball and roller bearing manufacturing	4.4
Spring and wire product manufacturing	4.1
Metal can, box, and other metal container (light gauge) manufacturing	3.9
Coating, engraving, heat treating, and allied activities	3.9
Other fabricated metal manufacturing	3.8
Valve and fittings other than plumbing manufacturing	3.0
Plate work and fabricated structural product manufacturing	1.7
Nonferrous metal foundries	1.3
Hand tool manufacturing	1.2

Source: IMPLAN, 2010.

INDUSTRY CLUSTER PROFILE

In the five-county region, the cluster includes 75 establishments and employed 2,539 people in direct cluster jobs in 2010. This cluster has a higher than average concentration of economic activity, as defined by firm and employment LQ, in both the Reference Region and the five-county region, when compared to the nation's economic activity in this cluster overall (Figure 4).

Although few large employers are within the five-county region (only seven firms have 100 or more employees), the surrounding metropolitan areas host major national and global companies in this industry cluster (Figure 5). Companies usually manufacture metal parts or components used by customers, such as the automotive, aerospace, industrial machinery, agricultural implement, and construction industries. Some companies produce finished products like building components, tools, and industrial valves.

Location Quotients (LQ) are used to evaluate local development opportunities and find businesses which are especially suited for the Region. A LQ is the ratio of the employment percentage represented by a given industry in the county to the percentage which industry represents in the state or a representative area of interest. A ratio greater than 1.0 indicates a higher local concentration and a likelihood of exports from the county; a ratio less than 1.0 may suggest that goods or services are imported into the Region.

Figure 4: Fabricated Metal Products Manufacturing: Economic Activity Summary

Indicator	Five-County Region	Reference Region (32 Counties)
Number of Firms (2010)	75	806
<i>Percent Change in Number of Firms (2007-2010)</i>	5.6	-1.9
<i>Firm Location Quotient (LQ)</i>	2.4	2.0
Employment (2010)	2,539	20,796
<i>Percent Change in Employment (2007-2010)</i>	-24.7	-23.6
<i>Employment Location Quotient (LQ)</i>	3.8	1.9

Sources: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) and the Purdue Center for Regional Development (cluster definitions), 2012.

Figure 5: Fabricated Metal Products Manufacturing: Major Employers, Five-County Region

Company Name	# of Employees	NAICS Industry Description*	City
Neiswander Enterprises, Inc. (Raynor Mfg. Company)	1,000	Metal Window and Door Manufacturing	Dixon
Elkay Manufacturing Company	300	Plate Work Manufacturing	Savanna
Metform LLC	190	Iron and Steel Forging	Savanna
Irwin Industrial Tool Company	150	Hand and Edge Tool Manufacturing	Freeport
Swenson Spreader LLC	125	Sheet Metal Work Manufacturing	Lindenwood
Anchor Coupling, Inc.	100	Fluid Power Valve and Hose Fitting Manufacturing	Dixon
Modern Plating Corporation	100	Electroplating, Plating, Polishing, Anodizing, and Coloring	Freeport
Anchor-Harvey Components LLC	97	Nonferrous Forging	Freeport
J T Cullen Company, Inc.	70	Plate Work Manufacturing	Fulton

*North American Industry Classification System.
Source: Dun & Bradstreet, Inc., 2012.

INDUSTRY TRENDS¹

Varying Demand Cycles:

The demand for metal products is affected by varying needs in customer industries. Production of industrial equipment can vary 10.0% to 20.0% in a year. Spending in the aerospace, automotive, and construction sectors is also volatile.

Customers Moving Overseas:

Many metal products customers, such as auto companies and appliance manufacturers, have moved their production abroad to take advantage of lower labor costs and to position themselves to sell products to a growing international market, pushing suppliers to move with them or face losing business to foreign manufacturers (especially if they use just-in-time inventory management). However, the recent growth in labor and transportation costs in key foreign production sites, such as China, may blunt this effect and return some manufacturing back to the U.S.

New Powder Metal Applications:

Powder metal parts are often cheaper to produce and, in some cases, are lighter or have better performance characteristics than traditional metal parts. The light weight of powder metal parts is especially attractive in automotive applications.

MARKET OPPORTUNITIES²

New Manufacturing Materials:

New metal alloys with desirable physical properties allow manufacturers to upgrade existing products and introduce new ones. Such alloys have been especially useful for products which must operate in extreme conditions, such as inside engines and in cooling applications. However, the use of new materials requires a large prior investment in engineering and testing.

Greater Complexity of Final Products:

As machinery and other products become more sophisticated in function and design, the parts used to build them typically also become more complicated, requiring more engineering and tighter manufacturing specifications. Manufacturers who can invest in modern fabricating technology can increase market share.

New Production Methods:

New rapid prototyping methods produce delicate parts good for sizing and ergonomic studies. Lasers have increasing applications in metal parts manufacturing, such as laser cutters used in sheet metal industries. New fabrication technology for metal parts, like laser-assisted arc welding, can rapidly produce part molds directly from CAD files, thus bypassing the traditional need for tooling. New metal casting technology can reduce the time from initial design to production.

Increased Customer Outsourcing:

Equipment manufacturers are increasingly outsourcing the production of parts that they formerly made themselves. Much of the sheet steel and steel plate bought by manufacturers from metal service centers is processed by a fabricator under an outsourcing arrangement before delivery.

Nonmetal Product Line Additions:

Many companies are expanding their product line, sometimes adding nonmetal items. Manufacturers of metal windows and doors may also manufacture vinyl and wooden products. Manufacturers of industrial metal valves may also produce plastic versions for certain applications.

SUPPLY CHAIN

The supply chain analysis provides insight into the value of supply chain inputs, the amount of inputs produced in a region for the industry clusters studied (represented in most cases by an absorption rate), and the stages along the supply chain which stand out as areas of competitive advantage. High absorption represents areas along the Fabricated Metals Products Manufacturing supply chain which allow the Region to capture the most value from a specific stage in the production or delivery of products and services within the supply chain. Several of the clusters are represented by the same supplier types because they have similar supplier needs.

¹ Source: Hoovers, Inc., 2013. (www.hoovers.com)

² Source: Hoovers, Inc., 2013. (www.hoovers.com)

INDUSTRY CLUSTER PROFILE

Conversely, stages along the supply chain which are underperforming offer opportunities for business attraction and/or entrepreneurship. When reviewing data relating to industry inputs, comparing both the absorption rate and the total value of inputs is important because certain services or components which maintain a high absorption rate may be of low value to the regional economy. Similarly, certain inputs, regardless of value or absorption, may be of high strategic importance to the Region in its efforts to build a stronger industry cluster.

The supply chain information provided indicates the flows of trade which support the Fabricated Metal Products Manufacturing-related cluster both within the five-county region and outside the Region. The key sectors which may be appropriate targets for expansion are imports (gaps) from outside the Region, but still within the industry. These gaps are then analyzed in terms of regional strengths and potential areas for targeting and support and are placed into a supply chain model in order to determine the stages of the supply chain with the strongest regional presence. To fully develop a Fabricated Metals Products Manufacturing cluster, the five-county region can make the most progress by focusing on sectors which do not yet have a strong regional presence, but which have significant development potential (Figure 6).

Supply Chain

An essential component for an industry cluster is the local supply chain. While not all inputs (goods or services) which an industry cluster needs can be produced in the local economy, it is desirable to meet as many of the cluster's needs locally as possible. This analysis reveals the source and amount of purchases among the unique niches within an industry. By identifying the total industry economic outputs and areas where goods and services are purchased from outside the regional economy, one may be in a better position to determine which areas of the industry supply chains are strongest, as well as those which present the best opportunities for growth within the five-county region.

Regional Supply Gap

Difference between Gross and Regional Inputs: a large gap value indicates that a large amount of inputs are imported into the region, rather than produced within the five-county Region.

Regional Inputs

The dollar value of gross inputs which are produced within the Region.

Gross Inputs

Total dollar amount of inputs used by the industry within each sector.

Figure 6: Fabricated Metal Products Manufacturing: Largest Supply Chain Gaps

Industry	Regional Supply Gap	Regional Inputs	Gross Inputs	% Purchased from Outside the Region
Aluminum products from purchased aluminum	-\$15,549,126	\$12,038	\$15,561,164	99.9%
Machined shops	-\$8,666,884	\$18,437	\$8,685,322	99.8
Steel products from purchased steel	-\$7,404,186	\$216,558	\$7,620,744	97.2
Motor vehicle parts	-\$6,788,906	\$63,932	\$6,852,838	99.1
Coated, engraved, heat treated products	-\$5,101,853	\$104,318	\$5,206,171	98.0
Turned products and screws, nuts, and bolts	-\$4,729,290	\$160,638	\$4,889,928	96.7
Plates and fabricated structural products	-\$3,855,082	\$117,477	\$3,972,559	97.0

Source: IMPLAN, 2010.

INDUSTRY CLUSTER PROFILE

For example, the regional Fabricated Metals Products Manufacturing cluster requires \$15.5 million in inputs (i.e., the products or services required to create a finished product) from the “aluminum products from purchased aluminum” industry. However, only \$12,000 of the required inputs from this industry is produced within the region, with the balance being purchased from outside the five-county region. This indicates that there may be an opportunity for an existing firm or new business to satisfy the regional demand for these products.

The supply chain gap for “machine shops” also presents a unique opportunity for existing business development. In general, machine shops produce a wide variety of parts or components based on customer requirements. Since most specialize in low-volume, fast-turnaround orders, they are quite versatile and are only limited by their production equipment and the skills and capabilities of their workers. Therefore, a regional initiative aimed at expanding the capabilities of machine shops could benefit the supply chain needs of several key manufacturing sectors.

Aluminum products from purchased aluminum (NAICS Sectors 331315, 331316, 331319)

Subsectors include the following:

- » Aluminum flat rolled sheet, plate, foil, and welded tube
- » Extruded aluminum rod, bar, pipe, tube, and tube blooms or drawing tube
- » Nails made in aluminum wire drawing plants
- » Wire, bare, or cable made in aluminum wire drawing plants

WORKFORCE REQUIREMENTS, SUPPLY AND DEMAND

Even as employment in the cluster has declined during the past decades (a trend that is projected to continue) the supply of potential new workers is comparatively low because of demographic trends and the propensity of younger workers to pursue careers outside of manufacturing. Over half of workers employed in the industry in 2010 were 45 year of age or older, with only 5.9% under the age of 25 (Figure 7).

Figure 7: Fabricated Metal Products Manufacturing: Employment by Age Group, Five-County Region, 2010

Age Group	Employment (Percent of Total)	Average Annual Wage
Under 25 Years	5.9%	\$16,658
25-44 Years	35.9	41,135
45-64 Years	55.2	53,686
65 Years & Older	2.9	71,042

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2011.

Over two-thirds of the employment, as well as 59.3% of the wages, in the Fabricated Metal Products Manufacturing cluster are concentrated in Production; Installation, Maintenance, and Repair; or Transportation and Material Moving occupations (Figure 8). The production and related employment classification accounts for the largest single share of the jobs in the Region. Ensuring that appropriately skilled production workers are available at competitive rates of compensation will be critical to maintaining the Region’s manufacturing sector³.

Figure 8: Fabricated Metal Products Manufacturing: Staffing Patterns, Five-County Region

Occupational Classification	Share of Employment	Share of Wages	Average Annual Wage
Production	61.5%	51.3%	\$34,348
Office and Administrative Support	10.5	9.0	35,023
Transportation and Material Moving	5.9	4.1	28,851
Management	5.2	13.8	107,876
Architecture and Engineering	3.9	6.1	64,279
Installation, Maintenance, and Repair	3.7	3.9	42,617
Business and Financial Operations	2.8	3.9	59,039
Sales and Related Occupations	2.4	3.8	64,522
Construction and Extraction	2.0	2.1	43,909

Sources: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) and the Purdue Center for Regional Development (cluster definitions), 2012.

³ In 2008, Production; Installation, Maintenance, Repair; or Transportation and Material Moving occupations accounted for 23.0% of all occupational employment in Workforce Investment Board Region #4.

INDUSTRY CLUSTER PROFILE

The challenge for employers is the looming demand for replacement workers as older workers retire. The Illinois Department of Employment Security estimates that nearly

200 openings for production workers will become available per year between 2008 and 2018, most of this resulting from the demand for replacement workers (Figure 9).

Figure 9: Occupational Employment, Projected Demand by Worker Classification Workforce Investment Board Region #4, 2008-2018*

Occupational Classification	Employment		Employment Change 2008-2018		Average Annual Job Openings		
	2008	2018	Number	%	Growth	Replacement	Total
Production	9,653	8,806	-847	-8.8	5	191	196
Office and Administrative Support	11,256	11,371	115	1.0	46	242	288
Transportation and Material Moving	6,297	6,479	182	2.9	25	153	178
Management	7,959	7,693	-266	-3.3	13	123	136
Architecture and Engineering	1,116	1,073	-43	-3.9	3	25	28
Installation, Maintenance, and Repair	2,798	2,930	132	4.7	15	55	70
Business and Financial Operations	3,110	3,385	275	8.8	28	64	92
Sales and Related Occupations	7,815	8,049	234	3.0	27	241	268
Construction and Extraction	4,047	4,188	141	3.5	16	68	84

*Workforce Investment Board (WIB) Region #4 consists of Carroll, JoDaviess, Ogle, Stephenson, and Whiteside counties.

Source: Illinois Department of Employment Security, 2012.

Because of the competition with surrounding metro areas for workers with specific skills or experience, compensation levels are a concern for local businesses³. For example, the projected demand for production workers in the metro areas around the five-county region is estimated to be 2,398 openings per year between 2008 and 2018⁴. The estimated average annual wage for production workers is \$36,200⁵. While this matches the wages for the five-county region, the surrounding metro areas have the added advantage of a greater number of employers and more job opportunities from which to choose within a reasonable commuting distance. Given the expected intense competition for skilled workers, companies will need to monitor compensation trends in order to recruit and to retain qualified employees.

BUSINESS OPERATING COSTS

Annual operating costs are provided solely for comparisons. Only major geographically variable operating costs are included for a series of seven county sites in the U.S. These consist of the five counties in the Region along with two additional counties which have significant concentrations of businesses in the Fabricated Meta Products Manufacturing cluster. One of the two out-of-state counties is located in the Midwest region, and the second is located in an alternative U.S. region. Costs which did not vary significantly with geography, including relocation and start-up expenses, were not considered (Figure 10).

³ Northern Illinois University, Center for Governmental Studies, "Promoting Regional Prosperity in Northwest Illinois: Wage and Benefit Report", August, 2012, p.23.

⁴ Source: Illinois Department of Employment Security, 2012.

⁵ Sources: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) and the Purdue Center for Regional Development (cluster definitions), 2012.

Figure 10: Fabricated Metal Products Manufacturing:
Total Geographically Variable Operating Cost Comparison

County Name	Total Annual Operating Costs
Medina County, OH	\$17,904,627
Whiteside County, IL	17,195,799
Ogle County, IL	17,192,102
Stephenson County, IL	17,094,735
Lee County, IL	16,900,999
Carroll County, IL	16,857,808
Anderson County, SC	15,826,732

Source: The Boyd Company, Inc., 2012.

The five-county region was the most competitive with its peers in terms of shipping costs versus the comparative counties, highlighting the importance of northwest Illinois' transportation assets and its access to national and global markets. The Region was also cost competitive with its peers in the Great Lakes region in terms of labor costs and site acquisition and property tax costs.

Costs of Doing Business

Since most businesses operate in a real-time global marketplace, their focus is on maintaining a comparative advantage through sourcing and supplying products profitably. Cost components such as labor, taxes, real estate, and utilities are the key measures which most companies use to decide where to locate or expand their operations.

Operating cost analysis focuses on those key geographically variable cost elements which are considered to be the most pivotal within the corporate site selection process and overall target industry competitiveness.

KEY TAKEAWAYS

- » The Fabricated Metal Products Manufacturing cluster in the five-county region has a concentration of firms which is 2.4 times the national average, and an employment concentration which is 3.8 times the national average.
- » The competitive advantage has declined in the past, possibly due to the effects of the recent recession and a long-term term decline in manufacturing. Intervention with existing companies, as well as with the regional workforce will be necessary to stem this decline.
- » The Fabricated Metal Products Manufacturing cluster is diverse. Several subsectors have the potential for further development based on supply chain relationships with other industries in the Region and surrounding metro areas including aluminum and steel components; motor vehicle parts; coated, engraved or heat-treated products; and machine shops.
- » Opportunities likely exist for companies to develop new supply chain relationships with companies in nearby metro areas or outside the industries they already serve, but more research is needed to identify and develop those opportunities.
- » The supply chain gap for machine shops presents a unique opportunity for the expansion of existing businesses. A regional initiative aimed at expanding the capabilities of machine shops could benefit the supply chain needs of several key manufacturing sectors.
- » Small niche manufacturers (such as machine shops) can be supported as part of a strategy to support small business and entrepreneurship in the Region.

Produced by the Center for Governmental Studies with financial support from the U.S. Economic Development Administration.



NORTHERN ILLINOIS UNIVERSITY

**Center for
Governmental Studies**

Outreach, Engagement, and Information Technologies

148 N. Third Street, DeKalb, IL 60115 · 815-753-1907

**BUILDING STRONGER REGIONS THROUGH
INNOVATION AND COLLABORATION**

www.cgs.niu.edu