Metals Processing Facilities

METAL FABRICATOR RE-ENGINEERS AND EXPANDS FACILITY TO CAPTURE MARKET SHARE

A fabricator of metal systems furniture for the computer industry located in Colorado needed to double production output to $80,000,000 in annual sales. The manufacturer retained Sievert to analyze the production work flow, engineer a more efficient layout of existing operations, and design a building addition to increase production output. Sievert's new design improved utilization of existing space, increased output, and reduced wait time, material handling and storage requirements. The manufacturing process generally flowed from receiving to precision sheet metal fabrication to welding and grinding to painting to assembly to finished goods storage.

Vipros Cutting Machine

Work was originally assigned to machines based on a period (cycle) manufacturing approach. Different product lines were processed on scheduled days each month. The new manufacturing strategy incorporated more efficient and flexible production machinery and rearranged fabrication operations into four work cells based on part families with similar processing requirements. The size of the facility increased from 91,000 to 200,000 square feet.

Your property, plant, and equipment can be a source of competitive advantage or disadvantage. In resource-constrained, competitive business environments there will always be pressure for managers to find faster, cheaper and better ways to satisfy internal and external customers. A purpose of this publication is to review some ways that metals processing companies (primary, recycling and fabrication) can improve overall corporate competitiveness and increase the return on facilities assets and resources.

APPLYING THE VALUE ENGINEERING METHOD TO IMPROVE BUILDING PERFORMANCE AND MINIMIZE CONSTRUCTION COSTS

The Sievert Group was commissioned to provide comprehensive engineering, architecture, and construction management services for a new metals fabrication facility located on the south side of Chicago. The 53,000 square foot plant was designed to accommodate welding, plasma cutting, grinding, and painting processes plus administrative functions.

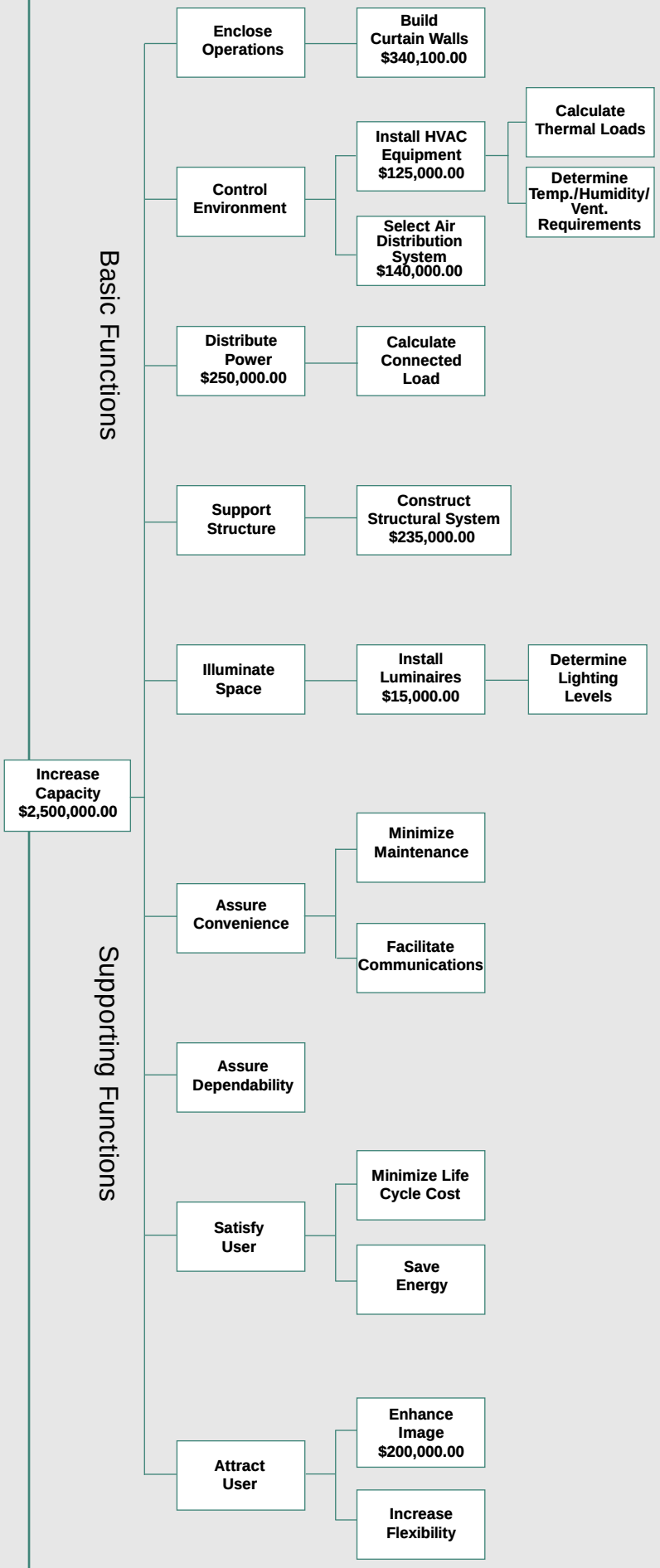
Initially, the project owner retained Sievert to provide process engineering and agency construction management services only. A small commercial architecture firm created a design concept for the new manufacturing facility before Sievert became involved with the project. Sievert completed engineering studies and prepared an estimate of the probable cost to construct the facility based on the architect's preliminary design concept drawings and owner's proposed plant layout. When Sievert completed the above tasks it became apparent that the architect lacked industrial design experience. The architect's estimate that formed the basis of the owner's original capital budget was grossly under-estimated and numerous design features were not based on generally accepted industrial design practices. The owner abandoned the original design concept and added preparation of architectural and structural construction documents to Sievert's scope of work.

After completing approximately one-third of the design and gathering preliminary cost estimates for construction of the building and process support systems, Sievert performed a formal value engineering study. The purpose of the study was to identify and eliminate unnecessary facility design features that add to the construction and life cycle costs but do not increase customer acceptance of the facility. It is highly recommended to complete a value engineering study early in the design phase when the opportunity to control costs is still virtually 100 percent and the cost to make changes is little or nothing. As the design develops the opportunity to control costs drops and it is more costly to make design changes.

As a result of the study, Sievert identified and achieved the customer-required functions with the least expenditure of funds. Sievert also identified the construction cost early in the project life cycle before it was too costly and time consuming to make the changes needed to improve overall project performance. A guaranteed maximum price to complete the project was determined during the conceptual design phase.

The chart at the right is a summary of the value engineering study results and a Function Logic Diagram that illustrates basic and supporting functions of the new facility with all cost allocations.

Functional Logic Diagram New Metal Fabrication Facility



NEW METAL FABRICATION FACILITY

Gross sq.ft. before VE Study: Approximately 53,000sq.ft.
Gross sq.ft. after VE Study: Approximately 53,000 sq.ft.
Construction cost estimate before VE Study: Approximately $1,908,000.00
Construction cost after VE Study: Approximately $2,500,000.00*

Summary of Technical Design Parameters before VE Study	Summary of Technical Design Parameters after VE Study
Exterior walls-spectroglaze, fluted and split-face block. This is a special order masonry.	Load bearing pre-cast panels. The pre-cast concrete panel system is less expensive than masonry and eliminated the need for a cast-in-place concrete foundation wall.
The wall detail esthetic features were excessive and not in accordance with generally accepted design practices.	Postpone build-out of portions of the lobby, reception and office areas until funds are available.
Excessive amount of storefront glazing at front elevation with insufficient structural reinforcement considering the height of the glass.	Eliminate storefront glazing.
Special masonry column wraps at $4,000.00/each.	Eliminate column wraps and exposed exterior columns.
The perlite masonry wall insulation specified was expensive and inappropriate for the application. The perlite will not fill the voids in the CMU because the masonry mortar prevents the perlite from filling the voids.	Pre-cast panels come with insulation.
Special exposed structural steel shapes.	
No entrance vestibule to control drafts and temperature.	
Expensive ceiling system.	Lower ceiling system height.
75 foot candle lighting level in office is excessive.	Reduce ambient lighting level to reduce air conditioning and electric loads.
Equipment with the highest electrical loads is located far away from power source.	Relocate transformer switchboard to the rear of the building where the highest electric loads are.
Toilet rooms at remote locations require more plumbing material.	Combine toilet rooms into one area to minimize the extent of plumbing piping.
Extensive underground storm sewer system.	Sheet drain the parking lot towards the storm water detention pond in lieu of installing an underground storm sewer.
Variable air volume supply system with electric reheats.	Use single zone, constant volume system with perimeter electric baseboard heat in lieu of variable air volume. Eliminate electric reheats in the air conditioning units. Reheats can be added in the future.

*Note in this particular case the estimated construction cost increased after the value engineering study. This result occurred because the original designer provided a cost estimate “made in heaven.” It was based on an incomplete scape of work, improper construction details and overly optimistic cost estimates.

SIEVERT GROUP HELPS ALUMINUM SIDING COMPANY CUT ORDER-RESPONSE TIME BY 57 PERCENT

Situation

To better compete in the market place, a midwest manufacturer of aluminum siding needed to accelerate its order-response time for painted siding.

Options

1. Increase inventory to have 20 different colors of coiled stock on hand.
2. Take the paint process in-house.

Solution

Company management opted for no.2, but knew they would need professional assistance from a firm that understood its business and was aware of their manufacturing requirements.

The manufacturer partnered with the Sievert Group to be assured that this major process change would be successfully implemented with a minimum of disruption to its regular operations and be on time and within budget.

Services

Professional Services Provided Include:

- *Facilities programming*
- *Plant layout*
- *Process engineering*
- *Cost estimating and budget assistance*
- *Electrical engineering*
- *Environmental engineering*
- *Mechanical engineering*
- *Project management*

Result

In less than five months the painting process was operational, enabling the manufacturer to process, manufacture and ship an order in as little as two days time.

Contact us

If your current manufacturing operations are causing you to lag behind the competition, call the Sievert Group for a complete manufacturing analysis. Our project teams have the experience and expertise to identify manufacturing challenges and then design and manage a workable, cost-effective solution.

HIGH PRAISE FROM ANOTHER SATISFIED CLIENT

Please pass on our appreciation of a job well done to all the tradesmen and management team that installed the coating line at our Peru, IL facility during the first quarter of 2000. Frankly, I am pleasantly surprised to find that we have had no problems with steering the coils through the line. This speaks volumes about the excellent alignment of the process equipment. The air hydraulic piping also looks great and we have had no leaks.

It was a pleasure working with you and the team you put together for this project.

USING VALUE ENGINEERING STUDIES TO DEVELOP CUSTOMER-ORIENTED PRODUCTS OF SUPERIOR VALUE

It is generally accepted that competitive success in today's marketplace requires that companies change the way they do business and that they relate more closely to their customers. Traditional methods of operation are no longer acceptable. Today we must accomplish more with less. It may be necessary to change cost structure, organizational design, product design, manufacturing and administrative processes, facilities and technology in order to generate revenue streams.

The real challenge today is to provide a product, system or service in conformance with customer requirements at a price that customers are willing and able to pay for while meeting your profit objectives. The Sievert Group performs value engineering studies and leads workshops to help businesses identify the changes necessary to remove unnecessary costs and satisfy their customers' needs profitably. Value management is a fiscal responsibility of every business manager.

What is Value Engineering?

Value engineering is a systematic multi-disciplined team approach for evaluating the functions performed by a product, process,project or service for the purpose of identifying and removing unnecessary costs, without compromising customer expectations relative to performance, reliability, quality or serviceability.

Applications for Value Engineering

Value engineering can be applied to any problem that can be expressed in functional terms. The method can be used to improve marketability, reliability, maintainability, and reduce cycle times but is usually used to solve identifiable cost problems.

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Following is an example of a a manufacturing oriented value engineering study:

FOCUS OF STUDY	To reduce costs and improve the process for manufacturing a strip nail.
TYPE OF BUSINESS ORGANIZATION	Diversified Manufacturer of Tools and Metal Materials for the construction industry.
RESULTS OF STUDY	Changed product design and packaging; eliminated non-value-added manufacturing tasks; and spun off, relocated and developed under-utilized processing centers into three profitable new business ventures with their own outside customers.
LOCATION	Midwest, USA
TEAM STRUCTURE	1 Sievert value engineering specialist 7 Executives representing marketing, engineering, accounting, purchasing and production.

FUNCTION LOGIC DIAGRAM

The Function - Logic Diagram shows "basic" and "supporting" functions and associated cost allocations based on a percentage of total cost for a fictitious manufacturer of steel nails.

Manufacture Strip Nails

Basic Functions		%
1 Receive Order		
2 Schedule Product		
3 Supply Process	31 BUY MATERIALS	1.0
	32 RECEIVE MATERIALS	5.7
	33 DISTRIBUTE MATERIALS	12.5
4 Make Nails	41 REDUCE THICKNESS	2.9
	42 FEED WIRE	.9
	43 STRAIGHTEN WIRE	.6
	44 GRIP WIRE	5.3
	45 FORM BEND	1.2
	46 CUT POINT	4.2
	47 DISCARD NAIL	2.8
5 Assemble Strip	51 FEED NAILS	3.3
	52 ORIENT NAILS	2.8
	53 REMOVE DEFECTS	5.7
	54 MAINTAIN ORIENTATION	3.6
	55 ESTABLISH COUNT	3.1
Supporting Functions		**%**
6 Assure Dependability	61 RESIST WITHDRAWAL	.6
	62 IDENTIFY MATERIAL	.9
	63 PROTECT PRODUCT	6.6
	64 INCREASE LUBRICITY	.5
7 Assure Convenience	71 MONITOR INVENTORY	1.9
8 Satisfy User	81 ASSURE ACCESSIBILITY	4.4
	82 EASE PAYOFF	.1
	83 EASE STRAIGHTENING	.1
	84 SORT MATERIAL	6.0
	85 CHECK CONFORMITY	13.8
9 Attract User	91 PREPARE SURFACE	1.3
	92 LUBRICATE SURFACE	.6
	93 IDENTIFY SOURCE	.5
	94 RETARD RUST	1.0

AUTOMOBILE SHREDDER

Sievert was retained by a large scrap metal recycling company to provide project management and design-engineering services for installation of an automobile shredder machine. The installation consisted of a massive machine foundation, an automobile in-feed conveyor, discharge conveyors for ferrous and non-ferrous scrap material, hydraulic equipment room and motor house, power distribution and lighting, concrete bunker walls, plumbing, heating and ventilation systems, steel framing and building enclosure system.

OTHER SPECIAL PROJECT ASSIGNMENTS

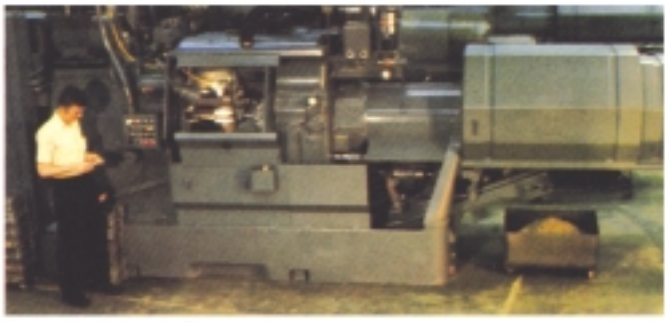
Other assignments completed for metals processing companies included pre-acquisition and post-occupancy studies of buildings-in-use, value engineering workshops to identify and eliminate unnecessary costs, work flow and plant layout studies, energy conservation and indoor air quality studies.

BLK Steel, Inc.

BLK Steel, Inc.
Wire Drawing Mill • Pickling Process Systems • Process Ventilation • Pollution Control • Complete Mechanical Support Systems.

Schwinn Bicycle Company

Schwinn Bicycle Company
Bicycle Frame Plant • Design and Build Mechanical System by Sievert • Water Reclamation Plant • Process Ventilation and Exhaust.



Spraying Systems Company

Spraying Systems Company
Primarily a metal turning and assembly operation, the plant space is conditioned by modular penthouse units designed with electrostatic precipitators • 1700 tons of cooling with a clean environment.

GET ACQUAINTED WITH SOME OF OUR METALS PROCESSING CLIENTS

(Primary,Recycling and Fabrication)

All Metal Manufacturing

Bliss & Laughlin

Chemcoaters, LLC

Cozzi Iron & Metal

Duo-Fast Corporation

Engineered Data Products, Inc.

G.E. Mathis

Griffin Wheel

Hudson Screw Machine Products

Hussman/Toastmasters

(Middleby Cooking systems)

Inland Ryerson Steel

Jomar Industries

Pettibone Corporation

Pyramid

R.D. Werner

Rego Co.

Rollex Corporation

Schwinn Bicycle

Senior Flexonics

Spraying Systems

Tempel Steel Co.

United Steel Deck, Inc.

Wycoff Steel Co.