

Electronics Technology, Computer and Telecom Facilities

IS YOUR COMPANY EXPERIENCING DIFFICULTY SOLVING FACILITY PROBLEMS OR COMPLETING MISSION CRITICAL PROJECTS?

The Sievert Group applies proven strategies and methods from a variety of engineering and design, project management, and operations management disciplines, combined with new enabling technologies to optimize your company's return from property, plant and equipment assets. The purpose of this publication is to inform you about the ways we help electronics, information technology and telecommunications companies increase profits. Typically, projects in high-tech environments are complicated and difficult to manage:

- In the high-speed world of changing technology, technologically advanced products may fail if they are introduced to the market too late. Time is of the essence.
- Complex functional and technical requirements must be defined and fixed early in the project life cycle to prevent "scope creep" and other problems that cause delays and cost overruns. Careful, detailed and thorough project programming is needed to assure responsive designs, reliable schedules and accurate budgeting.
- The decision-making process becomes more complicated due to the amount of information that is needed from a large number of people.
- Proper infrastructure support systems and process controls are required to assure systems reliability and to maximize equipment uptime.

The Sievert Group can work as an extension of your own staff on a project basis. We enjoy a reputation for sound engineering and design, planning and excellent project management. We achieve successful project completion within our customer's time, cost and technical performance parameters.

PROGRAMMING: A KEY TO PROJECT SUCCESS

A successful capital project is only as good as its program. Any company that expects to build or remodel a plant, relocate or consolidate operations, rearrange or install new production equipment must first define requirements precisely, establish priorities, evaluate design and project delivery alternatives. Failure to plan these projects carefully can result in unnecessary costs, schedule delays, quality deficiencies, excessive rework and disputes.

Project programming is a series of activities that assists in budget setting and establishing essential criteria for evaluating prospective sites, design alternatives and facility arrangements. The objective of programming is to define the project essentials, develop design concepts, and establish a realistic construction cost estimate prior to completion of detailed plans and specifications.

Based on a well-defined scope of work and completion of about one-third of the design, an improved cost control estimate can be developed. When the programming documents, cost estimate and schedule are approved, they become the basis for the preparation of more detailed construction documents which are suitable for obtaining competitive bids from contractors to perform construction.

The ultimate success of the project depends largely on how well the early phases are performed. It is extremely important to allocate sufficient time and money for proper programming.

Following are some examples of projects completed by Sievert within the electronics industry in Illinois, Indiana, Kentucky, Michigan, Missouri, Ohio and Texas:

ADVANCED MANUFACTURING TECHNOLOGY FACILITY

Architecture-engineering with construction management (AE-CM) for a Class 10,000 clean room, office and laboratory space to support cellular telephone manufacturing processes. The project site was approximately 20,000 square feet of existing vacant factory space within a building owned by the customer. Multiple contracts with specialty trade contractors were utilized. Specialty contractor activities were coordinated by the project owner through The Sievert Group acting as construction manager. The method of selecting the contractors was by invitation only and competitive bidding. The project owner also purchased major mechanical and electrical equipment direct from manufacturers to expedite delivery and avoid contractor price mark-ups on expensive equipment. The original schedule and budget objectives were achieved, despite changing program requirements while the design of this prototype hazardous production materials facility was in progress.

AUTOMOTIVE RESEARCH AND TESTING FACILITY

The Sievert Group provided engineering consultation and construction management for a world class automotive research and testing facility in Dearborn, Michigan to support the project owner's commitment to quality and total customer satisfaction. The installation consisted of state of the art engine dynamometers, chassis dynamometers, environmental chambers, and a host computer system for on-vehicle testing and validation of automotive electronic products.

Keeping contractor costs to a minimum was of great importance. Sievert and the project owner decided to use approximately 12 specialty contractors and five major process equipment vendors in an effort to ensure flexibility and the lowest base cost for the project. A critical path method (CPM) schedule was produced at the outset of the project to identify the interrelationships among activities and to establish the minimum project duration. The CPM schedule enabled the project team to identify different ways of building the project. However, the primary objective in using the CPM schedule was to focus attention on the critical path so management could easily identify critical activities and direct necessary resources.

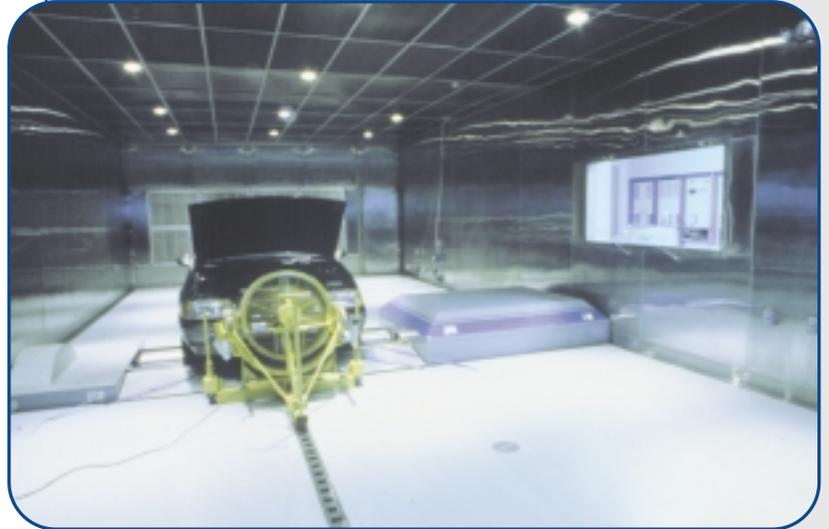
The engineering and construction management services provided by Sievert were key in completing the project on schedule and within budget. The extremely complex construction and systems required to support the process/laboratory type equipment presented a challenge to Sievert and the project owner.

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CLEAN ROOM



ENVIRONMENTAL ROOM FOR TESTING ENGINE PERFORMANCE UNDER EXTREME HOT AND COLD CONDITIONS



ELECTRONICS LABORATORY



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SENSOR ELEMENT MANUFACTURING FACILITY

The Sievert Group provided engineering design and construction management services for relocation of a Sensor Element Manufacturing Operation from Schaumburg Illinois to Northbrook Illinois. Improvements at the new manufacturing facility included:

1. 20% more useable space.
2. Clean rooms controlled to a "Class 1000" level, 50-to-1 improvement over the former facility.
3. Deionized water treatment and VLSI-grade nitrogen systems.
4. New process equipment to incorporate more automation, tighter control of operating parameters and higher capacity.

A survey by Ford Supplier Quality and Engineering Personnel indicated that the new facility ranked superior in all categories.

MIS BUILDING

Design of HVAC systems and mechanical support systems for a new computer and MIS facility of approximately 200,000 square feet were the focus of this project. The project received a First Place Energy Design Award from the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). The project required approximately 2,200 tons of air conditioning, a field erected cooling tower and mechanical equipment building. A heat recovery chiller was integrated into the mechanical system to provide hot water reheat for the ventilation systems.

OTHER EXAMPLES...

The Sievert Group engineered a new 106,000 square foot printed circuit board manufacturing plant in Joplin, Missouri and a 217,000 square foot warehouse in West Chicago, Illinois for a data products organization. Sievert also engineered a new 108,000 square foot addition to an electronics manufacturing facility in Sequin, Texas. We recently completed facilities to provide Internet services necessary to support one of our major customers' e-commerce transactions.

MECHANICAL SUPPORT SERVICES

Our Sievert Mechanical Services Unit provides mechanical and process support equipment installation and on-going maintenance services for our customer's facilities located in the Chicago area.

TELECOMMUNICATIONS EQUIPMENT MANUFACTURING FACILITY

The Sievert Group provided feasibility studies and comprehensive engineering services for a new chiller/boiler plant and replacement of DX/Gas air handling units with chilled water air handling units. The cost to retrofit the mechanical systems in this facility of approximately 1,000,000 square feet was in the range of \$10,000,000.

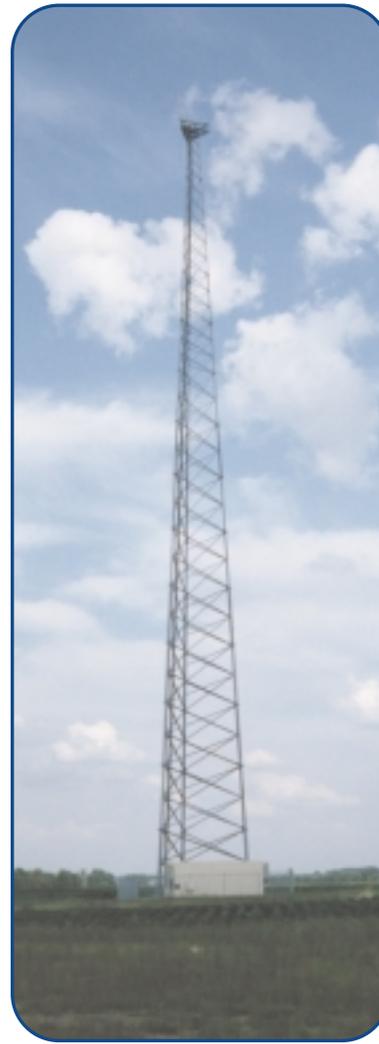
BUILDING PERFORMANCE/DIAGNOSTIC STUDIES

An engineering analysis was performed to benchmark the heating and air conditioning loads for a suite of executive offices in the world corporate headquarters facility of a multinational electronics company. A computerized load analysis and various tests were performed to determine excess/shortfalls in capacities. A report was written with recommendations for corrective actions. We also have completed numerous space utilization, work flow, energy conservation studies and pre-acquisition surveys for plant relocation and consolidation projects.

CUSTOMIZED TRAINING

Seminars and workshops were recently provided for U.S. Cellular, Ameritech, and Motorola on team-based methods to eliminate unnecessary costs and improve project performance.

PROJECT MANAGEMENT IN ACTION - TELECOMMUNICATIONS



The Sievert Group's in-depth capabilities in construction project management was demonstrated with the birth of the cellular mobile telephone industry. Ameritech Mobile Communications, Inc., the leader in this new technology, recognized the need to align itself with an experienced team of design/construction professionals to quickly establish its position in the highly competitive marketplace. They chose The Sievert Group to help them accomplish this task.

Despite the magnitude of the assignment, ***the Sievert-directed project resulted in the design and construction of 50 cell sites in Illinois, Kentucky and Ohio within nine months enabling Ameritech to get a head start in the emerging cellular telephone industry.***

BENCHMARKING AND PROJECT MANAGEMENT

Performance in project management is critical to the success of a facility management organization. Following are some ratios that are helpful for monitoring and evaluating project performance.

$$\frac{\text{Actual Project Cost}}{\text{Budgeted Cost}}$$

$$\frac{\text{Actual Time (weeks, days) to Complete Project}}{\text{Estimated Time (weeks, days) to Complete Project}}$$

$$\frac{\text{Project Management Cost}}{\text{Total Project Cost}}$$

$$\frac{\text{Dollar Value of Change Orders}}{\text{Total Project Cost}}$$

$$\frac{\text{Overhead Cost}}{\text{Total Project Cost}}$$

$$\frac{\text{Budgeted Cost of Work Scheduled}}{\text{Budgeted Cost of Work Performed}}$$

HIGH PRAISE FROM ANOTHER SATISFIED CLIENT

Regarding the recent Value Management seminar you conducted for our utility company early this year, I am pleased to inform you that we have achieved targeted cost savings in our construction projects and have improved customer acceptance of our services by implementing value analysis within our Real Estate and Building Services division. Your value analysis workshops and on-going support during the formal installation of our value analysis program has enabled us to meet our objective to become a low cost, quality provider of services.

GET ACQUAINTED WITH SOME OF OUR ELECTRONICS INDUSTRY CLIENTS

Advantis
AG Communications
Ametek - Panalarm Division
Ameritech
Ameritech Mobile Communications
Bodine Electric
CTS
GE Carboloy
G&W Electric Company
Hammond Organ Company
Knowles Electronics
Littlefuse, Inc.
Litton Kester Solder
Motorola, Inc.
- Automotive & Industrial Electronics Group
- Cellular Infrastructure Group
- Cellular Networks & Space Sector
- Corporate
- Energy Systems
- General Systems Sector
- Land Mobile Products Sector
- Lighting Division
- Management Information Systems
- Radio Network Solutions Group
Quasar Electronics, Inc.
Rixson-Firemark
Siemens
Sigma Metals, Inc.
Square D Electric Company
Sun Electric Corporation
TDI Batteries
Unisys
U.S. Cellular
U.S. Robotics/3 Com
Zenith
Xerox