

S T E E L C O N D U I T



**The Right
Protection,
Right from
the Start**



Roll-Kraft Corporation, Mentor, Ohio



STEEL CONDUIT PROTECTS ROLL-KRAFT'S VITAL CA



"Here at Roll-Kraft, we take downtime very seriously," says Chuck Gehrish, president of the Mentor, Ohio-based firm, a world leader in the manufacture of tube and pipe mill rolls. "We run 24 hours a day, six days a week, and our top priority is customer service. And believe me, no customer wants to hear that an order will be delayed because our computer system is down."

So it was natural, when Roll-Kraft planned its new, 110,000-square foot plant and office facility, that it specified steel conduit to shield its critical computers and computer-driven production machinery against electromagnetic fields, which causes electromagnetic interference (EMI).

Relying heavily on leading-edge computer technology, Roll-Kraft designs and manufactures rolls for shaping flat-rolled steel into welded tube and pipe. It also provides a variety of other services that relate to the processing and shaping of steel products.

Gehrish proudly points to the in-house CAD/CAM technology that Roll-Kraft has developed to tailor-design and manufacture rolls for specific customer requirements. The designs are perfected on the computer screen to ensure trouble-free performance of rolls.

CNC Programs Are Also Sent to Satellite Plants

"We use Computer Numerical Control (CNC) equipment that's all tied into our design software," he explains. "We make all of our CNC programs electronically and put them in a file server. Then they're called up on the machines as products are being designed." Roll-Kraft also sends its CNC programs to two satellite manufacturing facilities, in Mississippi and Illinois. So downtime affects not just one plant but three."

Gehrish assigned the task of making the computerized design and manufacturing system EMI-proof to Mark Principe, the company's



**Steel
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D/CAM SYSTEM FROM NEGATIVE EFFECTS OF EMI



Director of Information Services. Principe was familiar with the problems that can be caused by electromagnetic interference (EMI) on all types of sophisticated electronic equipment—problems ranging from distortion of images on monitors to alteration or destruction of data and disruption of vital communication links.

Steel Conduit Provides 'A Lot More Reliability'

Principe recognized that steel conduit provides excellent grounding as well as physical protection for wiring systems. But what really led him to insist on steel conduit for the new facility was its ability to shield against

electromagnetic fields. "The reliability you get in signals going through wires encased in steel conduit is much greater than if the wires are encased in aluminum or PVC conduit," he says.

That advantage was confirmed by a recent study by Georgia Institute of Technology that indicates that steel conduit is the most effective, by a wide margin, in reducing electromagnetic field (EMF) levels from encased power distribution circuits. It showed steel conduit can reduce EMF at 60 Hz power frequency levels by as much as 95%. The comparable reduction for aluminum conduit was just 10%, and plastic conduit was shown to be ineffective in

reducing field levels.

Principe feared that EMI could be created by the plant's overhead cranes, which are close to the wiring that runs to the CNC machines, and by several high-voltage power lines within the facility.

The shielding system specified by the facility's architect, the Weber Design Group, includes roughly 10,000 feet of steel conduit ranging from trade sizes 3/4 to 4.

Bottom Line—No Problems from EMI

Thanks to the effectiveness of the steel conduit, Principe says that since the new Roll-Kraft facility went into operation in 1998, there have been no problems experienced with EMI.

With the growing technology orientation of companies such as Roll-Kraft, Principe expects protection of systems against EMI will become increasingly important in the years ahead. "We're going to increase our reliance on computer technology in the manufacturing process, so we can't compromise the overall effectiveness of our wide-area network," he says. "As a result, at all of our facilities—satellite locations as well as the main plant here in Mentor—we'll make sure that everywhere we install wiring throughout our plants and offices it will be encased in steel conduit."

Life-Cycle Benefits Favor Steel Conduit

William A. Wolfe, Executive Director of the Steel Tube Institute of North America (STI), notes that EMI is an issue that should be considered in planning new facilities where sophisticated electronic and mechanical equipment will be operated.

"Some designers and engineers believe that they can save their clients money if they recommend wiring methods with a lower initial installed cost than steel conduit," Mr. Wolfe says. "But this is often a misconception, because they're not taking into account the significant advantages steel conduit provides and the long-term benefits it offers. Those benefits, including not having to retrofit to provide EMI shielding, can more than make up for any difference in initial cost for the building owner."

"Providing for EMI protection in the original building design costs only a fraction of what a shielding retrofit will cost," he says. "And the use of steel conduit with the original power distribution system will not only help ensure that today's operations aren't jeopardized by EMI, it will continue to provide protection over the years

as space uses and systems needs change."

"Steel conduit also saves money another way. It has built in grounding capabilities, so you don't need to run a separate equipment grounding conductor."

In addition to EMF shielding and proven equipment grounding characteristics, steel conduit provides a number of other advantages, notes Mr. Wolfe. "It provides superior protection from damage to conductors, is non-combustible, reduces hazards from fire, easily allows for additional circuits and is recyclable."

The Steel Tube Institute

The Steel Tube Institute was founded in 1930 and sponsors cooperative member efforts to improve manufacturing techniques for conduit and other tubular steel products and informs customers and fabricators about these products' utility and versatility. It is headquartered in Coral Gables, Florida.

Steel Conduit Provides Added Protection

Steel conduit protects electrical conductors against mechanical

and electrical damage, and provides excellent grounding for electrical equipment. It also protects against electromagnetic fields (EMF) that could hurt the performance of nearby computers and other electronic equipment. There are three basic types: Rigid Steel Conduit (GRC); Intermediate Metal Conduit (IMC); and Electrical Metallic Tubing (EMT).

Free GEMI Analysis Software Available

The Georgia Tech study that confirms the EMI shielding advantages of steel conduit is incorporated in the Grounding and ElectroMagnetic Interference (GEMI) analysis software, available free from the Steel Tube Institute. The GEMI CD helps you accurately calculate the electromagnetic field density of a network design for conduit-enclosed circuits. It also helps you confirm that your system design complies with the equipment grounding requirements of the NEC.

For your free GEMI CD, contact the STI. Log onto www.steelconduit.org and download it at no cost.

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