STEEL TUBE INSTITUTE

# STEEL CONDUIT

**CASE STUDY:**
**PUBLIC SAFETY BUILDING**
EAST CHICAGO, INDIANA

The tough steel tube that protects the thin blue line

**“STEEL CONDUIT CAN REDUCE ELECTROMAGNETIC FIELDS AT 60 HZ POWER FREQUENCY LEVELS BY AS MUCH AS 95%.“**

When DLZ Indiana Inc. was presented the opportunity to provide the electrical design work for Indiana’s new public safety building in the city of East Chicago, there was no doubt in their mind that the power distribution system had to be encased in steel conduit to guard against electromagnetic interference (EMI).

The building is designed to accommodate a 911 emergency dispatch center, a police station with a detention wing and an emergency medical service personnel group — all of which rely on sophisticated communications equipment.

The DLZ electrical design team knows from experience that steel conduit will shield against EMI by effectively reducing electromagnetic field (EMF) levels for enclosed power distribution circuits.

Their conclusions are supported by a research study conducted by Georgia Tech under the sponsorship of the Steel Tube Institute of North America. The study shows that steel conduit can reduce EMFs at 60 Hz power frequency levels by as much as 95 percent. The comparable reduction for aluminum conduit was just 10 percent; nonconductive, nonmetallic conduit was ineffective.

## STEEL CONDUIT SHIELDS AGAINST EMI

Steel conduit does two basic things. First, it reduces the EMFs created by electron flow through the conductors inside the conduit that can affect the performance of computers and other sophisticated electronic equipment. Second, it shields the conductors inside the conduit from being affected by external EMFs.

The most important consideration in the public safety building was to keep the high-power currents from affecting the very sensitive communications systems in the building.

Dr. Tim Raykovich is the owner of the building and the facility's project manager. He also is an electrical engineer and a medical doctor. Consequently, the decision to install steel conduit throughout the building wasn't a difficult one to make. The DLZ design team felt steel conduit above grade, as well as below the slab, was the right choice — and Dr. Raykovich readily agreed.

In fact, DLZ specifies rigid steel conduit even under a 6" or 8" thick concrete slab to shield against EMI.

## PROTECTING SYSTEMS: A KEY CONSIDERATION

Since both the design team and the building owner considered the electrical and communications systems to be a critical component of the building, protecting them was a key design consideration.

Although guarding against EMI was the primary driver in specifying steel conduit in the public safety building, DLZ's design team says the physical properties and life cycle cost advantages that steel conduit provides to both the building and its owner also are significant advantages.

Overall, the DLZ electrical design team specifies rigid galvanized conduit in areas containing electrical and mechanical equipment that could be subject to damage, and specifies electrical metallic tubing behind the walls and above ceilings.

The use of steel conduit in a building ensures that if there's a problem, or if circuits have to be replaced or added, it's easy to pull conductors out of conduit and replace them. That's a big advantage over using cable.

An additional benefit of steel conduit is that it does not contribute to the flammable and combustible material content in a building. That's an important consideration in the overall design of a public facility, and it can be a lifesaving issue if a fire occurs.

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DLZ also specifies other system upgrades, like upsizing the branch circuit wiring, which may add up to a few more dollars spent, but the DLZ design team knows that it provides a much better building system in the end. Their goal is to design in efficiency for today, while ensuring that the building remains cost-efficient through the years.

## DESIGN MEETS NEEDS OF TODAY, TOMORROW

When DLZ engineers a building, it aims to provide the owner with an 80-year life span. Including steel conduit in the building's infrastructure is a key step in attaining that life span.

The engineering firm recognizes that the use of steel conduit may mean slightly higher initial costs, but they know initial installed cost will be offset by significant savings in both life cycle and maintenance costs.