

## ACS FLEX 3+® WIRING SYSTEM ADDRESSES FORD'S NEED FOR FLEXIBLE HIGH BAY LIGHTING

In 1990, when the Ford Motor Company was installing a new engine manufacturing line at its plant in Cleveland, lighting specialists at Ford Engine Operations set out to find a better way to install lighting systems for automobile engine production lines.

Flexibility in all areas was one of Ford's prime concerns: they wanted machines that could be easily reconfigured to perform another operation, and they were looking for flexible lighting systems. The solution they found was modular lighting from America Cable Systems (ACS).

Since the Cleveland installation in 1990 and 1991, Ford Engine Operations has installed ACS cabling to support lighting for two engine lines at its million-square-foot plant in Windsor, Ontario. ACS lighting systems are also being installed for a third line in Windsor, currently under construction, and for a line in Lima, Ohio, also currently under construction.

### Lower Cost and Superior Hardware

There have been major paybacks from modular lighting in both installation and in subsequent modifications. The old fashioned way, installing conduit and pulling



Ford Motor Co. engine assembly line, Windsor, Ontario.

wire just takes longer and costs more in materials and labor. And, making changes in wiring is not nearly as easy with conventional pipe-and-wire as it is with modular wiring.

In addition, while Ford's lighting specialists came across lots of products that offered flexibility, they were also looking for connectors that could survive in a demanding industrial environment. The ACS connectors met Ford's construction, design and durability requirements. In addition, Ford wanted a five-wire system, which ACS could supply.

### Flexible Configuration Fits Tight Construction Schedule

One of the basic problems facing the lighting system designer at an engine manufacturing line is that the lighting must be installed before the machinery configuration is finalized. Once the roof is on a

new building, the lighting must be installed, because construction workers need light inside to do the work. The size of the machines used in a heavy manufacturing operation also presents a problem: each large machine needs its own foundation, and lighting people can't work overhead while machine foundations are being dug.

The high degree of flexibility offered by the ACS modular cabling system allows the lighting system to be installed before the machinery footprint is defined, and then easily and quickly modified after the machinery is installed.

Often, the schedule calls for machinery installation to start just after the lighting installation is completed. When the big machines are moved in, the lighting engineers may find out that a particularly tall machine is blocking a light, so it has to be moved. Each machine also needs extensive duct work for exhaust fumes, and the ducts may obstruct the lights. The ACS modular lighting makes it easy to move the lights around after the fact.

### New Installation in Lima, Ohio

The new engine manufacturing line being installed at the Ford plant in Lima, Ohio, is part of a

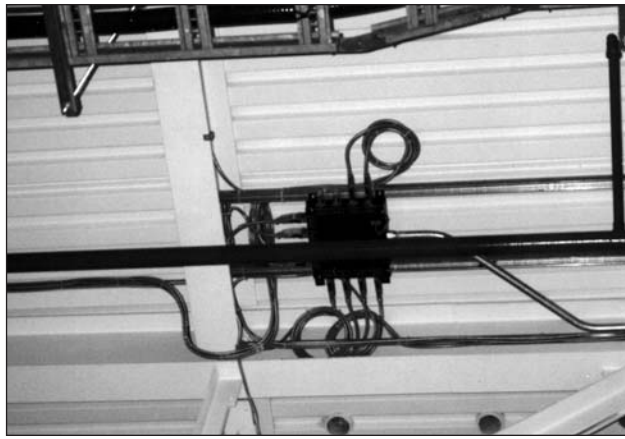
major plant renovation. Lighting is important for the people on the floor. They work with tight machining tolerances, and lots of small parts. They need to be able to read the part numbers. The goal of the lighting part of the overhaul was to bring the footcandles of available light up to an appropriate level in all work areas.

### Computer-Aided Drafting Speeds Design

The lighting system design for the Lima plant started with a generic design that called for four 400-watt, high-pressure sodium fixtures per 40x50-foot bay. The architect did a basic layout, showing fixtures, electrical distribution boxes, and initial cable routing. The architect's drawings were sent to the computer-aided drafting (CAD) department at ACS, where the layout was checked and translated into cabling requirements. ACS designers came up with the maximum cable length needed. The maximum length, plus a few feet extra for greater layout flexibility, becomes the standard cable length. Then the designers calculate how many total cables are needed, plus spares. The modular cables, including connectors, are then assembled at the ACS plant in New Bedford, Massachusetts.

### Superior Product Quality

ACS offers Ford superior quality. ACS makes its own metal-clad cable. The ACS connector heads have superior construction, materials, and design. They are easy to connect and disconnect and they meet UL standards for "make and break under load." That means that the connector must maintain a



**ACS Master Distribution Box distributes power to individual lighting fixtures.**

ground connection until after all three phases are disconnected. The pin and sleeve design of the ACS connectors makes this possible.

### Lower Cost, Simpler Installation, Easier Changes

ACS modular wiring is proving to cost less than conventional wiring for the Lima project. The labor cost for the old pipe-and-wire technology is high, and the ACS modular system cuts those costs. The modular system is much simpler to install than conventional



**The modularity of Flex3+ allows lighting fixtures to be disconnected and moved without interrupting power to other fixtures down the line.**

wiring. Conduit-and-wire must be hard-mounted to the structural steel in the truss work, with clamps. With the modular cables, installers just clip the cables to the underside of the truss flange. They hang light fixtures first, then bring the cables to the fixtures. If there is excess cable, it is coiled up and hung on the truss. The cost benefits

are even greater when the lighting system needs to be changed. Moving a light is a

simple process: just unplug the fixture and slide it to a new location, uncoil any excess cable, and plug it back in again. If an extra fixture or another length of cable is needed, the installer just unplugs one cable, adds in another modular cable, plugs it in, and the installation is complete. The lighting system has been designed with enough power to support one or two additional fixtures on each circuit, so there is plenty of flexibility to meet future needs.

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