



## CONVEYOR BELTS

### **FIRE DETECTION AND SUPPRESSION**

Conveyor areas need priority consideration. They typically are a single link in the process of transporting a product, if that link is broken; the process is stopped, resulting in business interruption. A fire can start anywhere along the conveyor system and can spread quickly to other areas creating major losses.

A conveyor system with belts, associated tunnels, galleys, drive houses, transfer houses and trippers are categorized as being a "Special Hazard" requiring special needs. Special considerations have to be addressed to provide a reliable system that will not be a nuisance and can provide the level of protection needed to minimize potential loss and business interruption. To minimize fire spread, proper detection and suppression have to work together to provide complete protection.

*Some of the special hazard considerations are:*

- Ambient Conditions
- Fire Source and Type - Stationary or Moving
- Fire Detection Methods
- Fire Suppression (Dry and Deluge Sprinklers)

#### **AMBIENT CONDITIONS**

Factors that need to be considered are varying temperatures, conveyor maintenance, hazardous electrical classifications, dust, humidity, water spray, moving parts, open or covered belts, drop chutes, and serviceability. A fire protection system then needs to be designed to live with these conditions and still perform, but we also need to consider installation ease, stability and service life.

#### **FIRE CONDITIONS**

The frightening reality is that the fire may be traveling at 200-400 feet per minute on the belt. This traveling fire can easily spread to other areas of the plant to create a devastating loss. A moving fire will go right past a fixed temperature heat detector or sprinkler head, not giving them time to detect the fire. And due to "thermal lag", the fixed heat detector or sprinkler head needs a much higher temperature than it's rating to try and operate in a short time period. There are many fire sources such as heat produced by friction, head pulleys, tail pulleys, drive pulleys, idler arms, drive motors, spontaneous combustion and foreign matter. There are many combustibles present with the fire sources themselves, the product, the structure, dust, oil, grease, debris, foreign matter and the belt.

**DETECTION / SUPPRESSION METHODS** - *Continued on next page.*

## **DETECTION METHODS**

Each conveyor system needs to be reviewed for its own special hazard considerations. Factoring in the known conditions, the detection needs to be flexible, rugged and serviceable while providing fast response and remaining stable in the harsh ambient conditions. **Linear heat detection** that is not fixed temperature - but can average heat build-up and is temperature adjustable is best suited for conveyor applications. The ability to average temperatures provides superior performance for moving fires and detection of large open areas. Adjustable capabilities are needed to optimize the sensing temperature given the varying conditions of each specific hazard and seasonal climatic changes. For Linear Heat Detection that is averaging and adjustable, see **FENWAL ALARMLINE CABLE**.

**Infrared detection** can be used to enhance detection in areas with moving machinery or open areas like drive houses, transfer areas and trippers. **Rate Compensated Spot Heat Detectors** may be used in some instances such as covered conveyors and drop chutes.

## **DELUGE SPRINKLER SYSTEM**

A Deluge System is the most effective suppression method for a conveyor area. It consists of automatic fire detection operating an electric valve, which holds back the water. The sprinkler piping system runs over the conveyors with open sprinkler heads. The sprinkler pipe is dry. When the Fire Detection System senses a fire it operates the Deluge System Valve and water will flow. Since the sprinkler heads are open, the water will spray out of all sprinkler heads at the same time. Therefore, even if the fire is moving on the conveyor belt it will be suppressed. A fast and effective detection system operating a deluge sprinkler system is the best conveyor belt protection.

## **DRY PIPE SPRINKLER SYSTEM**

The Dry Pipe System consists of a piping system that runs over the conveyors with closed sprinkler heads and supervisory air pressure in the pipes. This air pressure keeps a mechanical water valve closed so a fire needs to melt open a sprinkler head to allow the pressurized air to escape. When the air pressure drops, the water valve will then open allowing water to flow into the pipe and to the melted sprinkler head. In the case of a moving conveyor fire, it will be very difficult to melt open a sprinkler head as the fire passes by. When a head is melted, the fire will have moved past by the time water will get to the head. To compound this problem, when a sprinkler head is hanging pendant in the open air there is less heat collected to melt a head open. Sprinkler heads are inherently slow to react to a fire as compared with other methods of fire detection.

Dry Pipe Systems can be improved by installing quality detection to provide early fire warning and stop the belt. With the belt stopped and the fire stationary, the sprinkler heads can now more readily melt open. Water can then spray and extinguishes the stationary fire. If a belt cannot be shutdown, then the desired method is fire detection to operate a Deluge Sprinkler System and provide water spray on the complete belt length.

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