

**RSA**  
ENGINEERING & RISK CONTROL  
SERVICES

**MSBA**  
RISK MANAGEMENT

### ELECTRICAL TRANSFORMERS

As you may or may not know, electrical transformers are used to transform voltage from one level to another, usually from a higher voltage to a lower voltage. They do this by applying the principle of magnetic induction between coils to convert voltage and/or current levels. In this way, electric transformers are a passive device which transforms alternating current or 'AC' electric energy from one circuit to another through electromagnetic induction.

#### DRY TYPE TRANSFORMER

Dry type simply means it is cooled by normal air ventilation. The transformer case is ventilated to allow air flow and cool the coils. Dry type transformers require minimal maintenance but, of all the components in an electrical system, a transformer replacement can be a physically challenging event, extended delivery or a replacement or repair unit and expensive transportation costs.

Dust clogged vent-openings could cause the transformer to overheat and reduce the transformer life expectancy (10°C increase reduces half of life expectancy). Overheating failure may result in fire and school shut-downs. Maintenance should be done by an electrical contractor who can vacuum clean and provide the necessary maintenance and electrical tests.

Dry type transformers are well suited for installation in high rise buildings, hospitals underground tunnels, factories and schools. There are many more examples.

One Manitoba school was found with the following two transformers: They were lacking in electrical maintenance and good housekeeping. The air vents on the two 150-kVA step-down transformers were completely blocked with dust (see photos, below). The amount of dust noted would have taken years to accumulate. Although no breakdown was reported, it is believed they would have overheated and damaged the coils.

A good PM (Preventative Maintenance) Program should include regular cleaning of the transformers by a qualified person and infrared scanning on a 3 to 5 year interval.



#### TWO 150-kVA STEP-DOWN TRANSFORMERS WITH PLUGGED AIR VENTS

It is important to note that an arc flash can be spontaneous or result from inadvertently bridging electrical contacts with a conducting object. Other causes may include dropped tools or the buildup of **conductive dust** or corrosion.

During our inspection visits we often make note that various items are being stored in the electrical rooms and against the transformer(s). In the interest safety and loss prevention these objects should be removed to some other suitable area. A proper sign should be posted for each transformer with the following warning:

**“Do Not Put Any Object On Top Or Against The Transformer”**