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**Vacation Break for Electrical Machines**

**By Thomas Yoon**

**Vacation Break for Electrical Machines by Thomas Yoon**

Are you overloaded? Have you become a part of the highly stressed modern working environment? You may need a break – a vacation, a change in environment, a change of pace...

Similarly, machines can be overloaded too. Those that were designed for a particular system are often pushed to their limits when new requirements emerge.

Just like the final straw that breaks the camel's back, electrical machines too, can reach their breaking point. If there is no vacation for them, they will burn.

Fuses and circuit breakers are designed to stop the current in a circuit before any damage can occur – create a vacation or a break for them.

A circuit breaker is one of the ways to prevent motors (or other electrical machines) from burning due to overloading. All electrical motors produce heat when running. At the time of a fault, this heat builds up at a much higher rate than it can be dissipated. This can result in damaged equipment, fire or even explosion.

The electrical protective device like the circuit breaker is designed to de-energize the circuit before this heat level becomes dangerous.

There are basically 2 means of activating a break – thermally (heat) or magnetically.

## Vacation Break for Electrical Machines

Thermal circuit breakers make use of bimetallic strips that will bend due to the different expansion rates of each of the metals in the strip. The bending of the strip will move a tripping mechanism latch that will then open up the contacts of the circuit breaker.

Because bimetallic strips take time to heat up and bend, this type of tripping device is used for tripping prolonged overloaded situations. The setting for breaking the circuit at a particular overload value can be adjusted.

Magnetic circuit breakers make use of the field strength of

magnetic coils to trip a latch that will then open up the contacts of the circuit breaker. This method is used for high current faults, like in a short circuit. This method is designed to trip instantly.

A thermal–magnetic circuit breaker incorporates both a thermal strip and a magnetic coil. This type of circuit breaker is able to protect against momentary overloads as well as high or short circuit current faults.

What happens if the circuit breaker is placed in a high temperature environment? The thermal bimetallic strip bends on high temperature. In this case, the current is not causing the high temperature in the bimetallic strip, but the ambient air is! The current may still be below the safe operating rated value for the motor.

In this case, a compensating bimetallic strip may be incorporated into the circuit breaker to eliminate this type of error. These circuit breakers are often used in hot areas like furnace, oven, and boiler rooms.

Circuit breakers can be reset very quickly, once they have tripped. Can your break or vacation be reset very quickly too? Don't reset. Take a long break!

Until next time...

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Learn Electro–Technology Calculations for 1st Class Marine  
Engineers Competency License Exams at

e–book. Applicable for all electrical

installations both on ships and at shore.

Many years of working experience in Marine, Facilities, Construction has given the author material for writing e-books and articles related to engineering, and management.

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and

## **Burning Smells – Indication of Trouble**

**By Thomas Yoon**

### **Burning Smells – Indication of Trouble by Thomas Yoon**

What's that Burning Smell?

If you are running machinery, you will be asked this sooner or later. Machines produce heat. And heat produces burning smells. It's as simple as that! I am sure many of us can sense that something is not right when we smell burning. After all burning means overheating. Machines are not meant to overheat. But sometimes they do.

Questions...questions...

How to tackle this?

Is it from the electrical source, or the mechanical source? Is there an overload in the electrical circuits? Is there a loose electrical connection somewhere? How about mechanical? Are the moving parts lubricated well? Does the lubrication oil take the heat away?

Questions...and more questions... But that is the way to troubleshoot. The more questions you ask, the better you are at arriving at the solution. You look at the problem from all angles.

Give it a try! Ask questions, and more questions...

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Many years of working experience in Marine, Facilities, Construction has given the author material for writing e-books and articles related to engineering, and management.

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