

Re-striking voltage transient,  
current chopping

It is the transient voltage that appears across the contacts at or near current zero during arcing period.

At current zero, a high-frequency transient voltage appears across the contacts and is caused by the rapid distribution of energy between the magnetic and electric fields associated with the plant and transmission lines of the system.

The current interruption in the circuit depends upon this voltage.

If the restriking voltage rises more rapidly than the dielectric strength of the medium between the contacts, the arc will persist for another half-cycle. On the other hand, if the dielectric strength of the medium builds up more rapidly than the restriking voltage, the arc fails to restrike and the current will be interrupted.

# Current Chopping

Current chopping is a term that came to our vocabulary with the advent of vacuum switching which was commercially started back in the 1950's. Earlier switching means in air or oil are in terms of dielectric recovery rate relatively slow and as the main contacts would part the arc would go through several zero crossings before it would finally go out and the dielectric strength across the now open gap be strong to prevent a restrike, and

thus continuation of current for a further half cycle. With the introduction of vacuum as a dielectric medium that has a completely different characteristic to that of air or oil dielectrics in so much that it has a very rapid dielectric recovery rate.

Upon opening the main contacts of a vacuum interrupter whether is be a circuit breaker or a contactor, high velocity movements are easily obtained because of the low mass and small movements required to obtain arc isolation up to limited high voltages. As such, the arc will be extinguished at the first current zero and within half a cycle.

Because of the rapid recovery rate of the dielectric, the arc, in vacuum interrupter will tend to go out before current zero which will result in an instantaneous current drop to zero and lead to an induced voltage or voltage transient being generated to down-stream equipment.