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EFFECT OF ARMATURE REACTION IN SYNCHRONOUS MOTORS AND ROTARY CONVERTERS

BY MR. B. T. McCORMICK.

(Read before the Electrical Section, March 14, 1907.)

As a rule in treating the operation of synchronous motors and rotary converters, the diagrams are constructed without reference to the effect of armature reaction. The complete diagram of the rotary converter or synchronous motor depends upon the following laws:

1st—The vectorial sum of the generator or impressed E.M.F. E_g and the motor counter E.M.F. E_m is the reactance E.M.F. E_r .

2nd—The counter E.M.F. must be represented as lagging 90° behind the resultant field or magneto motive force.

3rd—The armature M.M.F. is in phase with the armature current.

4th—The E.M.F. component necessary to balance the reactance E.M.F. is equal and opposite to it in phase, and must, therefore, be represented as leading the current in quadrature.

5th—The resultant M.M.F., or that M.M.F. which when divided by the reluctance of the magnetic circuit gives the flux per pole, is equal to the vectorial sum of the M.M.F., due to the armature reaction, and the M.M.F. impressed upon the fields, as obtained from the ammeter readings in the field circuit.

6th—The total armature reaction may be expressed in amperes