CONCLUSIONS

- The primary contribution of this paper is to work out a feasible and practical CBM strategy for traction motor insulations based on their operating characteristics. Through periodic inspections, an operating mechanism comprising two failure modes and three operating states is proposed, which can make the best use of historical life information and inspection information. Moreover, it can overcome the drawbacks of excessive and insufficient maintenance of traditional time-based maintenance schemes.

- Another main contribution is to take extreme shock effect into account in the maintenance model. Traction motor insulation is different from normal deteriorating systems because of suffering random extreme shock loads during operation. In the proposed model, extreme shocks following a Poisson process are integrated into the maintenance model, which ultimately increases the accuracy of the maintenance model.

- Numerical investigations validate that by taking shock effect into account, insulations can operate at a lower risk of catastrophic breakdown and the operating cost is reduced considerably.