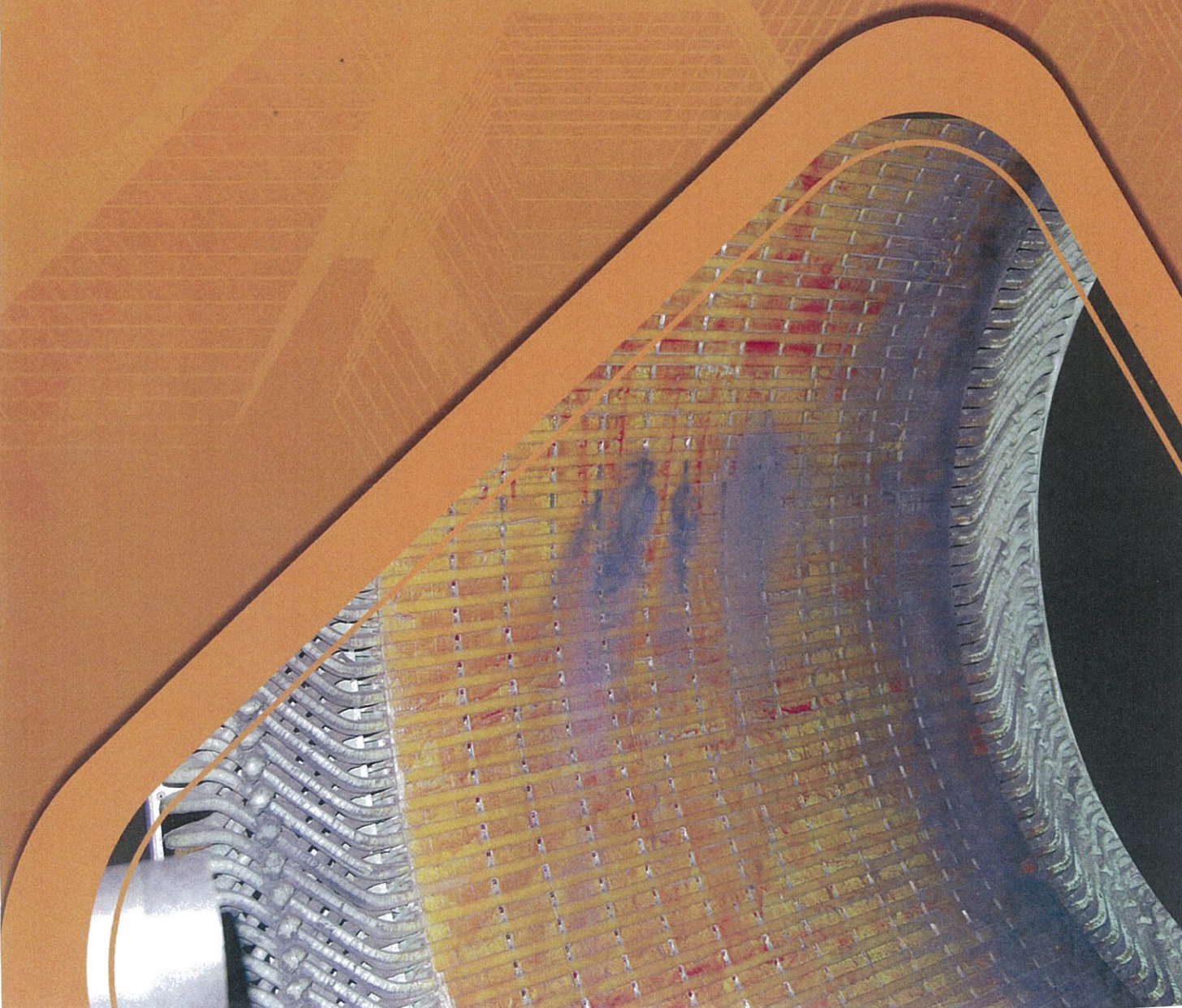




FORENSIC SERVICES
Consulting Scientists and Engineers

GENERATORS & **MOTORS** FAILURE ANALYSIS



FAILURE ANALYSIS

Compared with other major electrical equipment, the demise of motors and generators can be difficult to predict. Accordingly failures tend to be catastrophic



The photograph on the left shows the result of the end ring disintegrating, allowing the overhang of the rotor windings to interfere with the overhang of the stator windings.



Above is extreme wear on the slip ring of a motor. The motor had been installed in a brick plant where the clay dust had worn the slip ring.

Failure mechanisms specific to generators are

- Overspeed
- Improper synchronisation
- Loose wedging
- Motoring as a result of switchgear mal-operation
- Electrical imbalance

The right shows rotor damage at a rolling mill, with abrasion of laminations and fibreglass. The damage occurred when the shaft failed by fatigue.

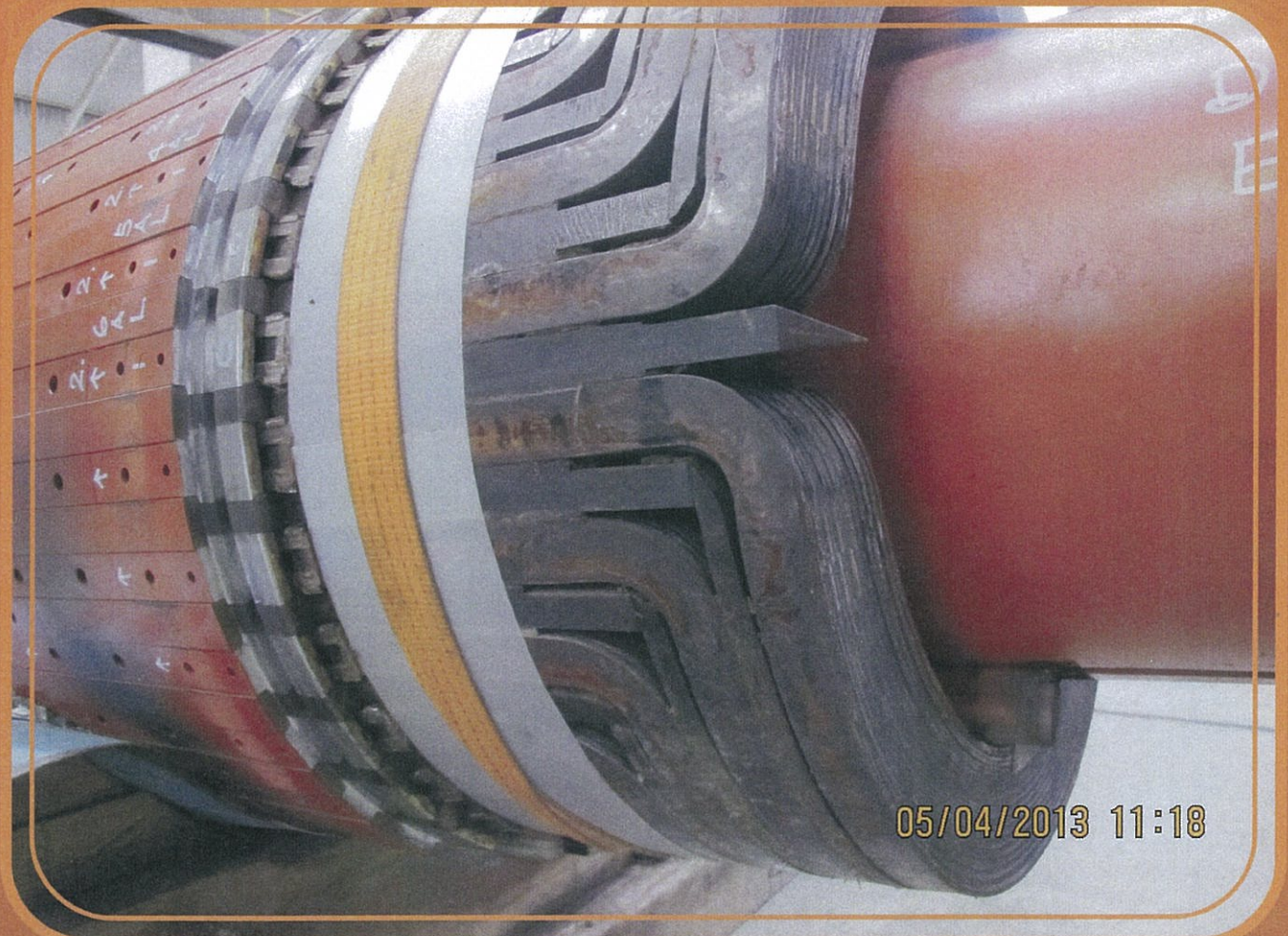


GENERATOR AND MOTOR ACCIDENT INVESTIGATION

The reasons Forensic Services is appointed to losses are as follows.

- Determining the cause of failure.
- Prevention of further losses.
- Determining the extent of damage.
- Advising whether repair is feasible.

Most heavy electrical equipment is manufactured in continents outside the region and manufacturers are wary of carrying out local repair. We can advise whether these fears are reasonable. In many cases the unnecessary transport back to the manufacturer can greatly extend the loss, both in terms of cost of repair and loss of production.



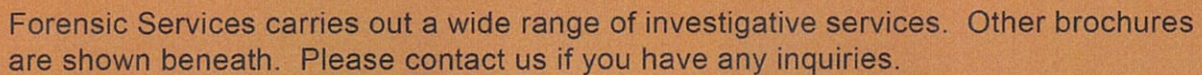
The two pole generator rotor above has suffered overheating and burning of the insulation, as shown by the colours of the insulation and the bare copper. However damage was confined to the rotor, which was able to be rewound at site.

Even when generator maintenance is sound, the overspeed of drivers (turbines/diesel engines) will be damaging.

The following causes apply to both generator and motors.

- Insulation breakdown
- Vibration
- Buildup of dirt resulting in temperature rise

Forensic investigations have been carried out in each of the countries named in the map below



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