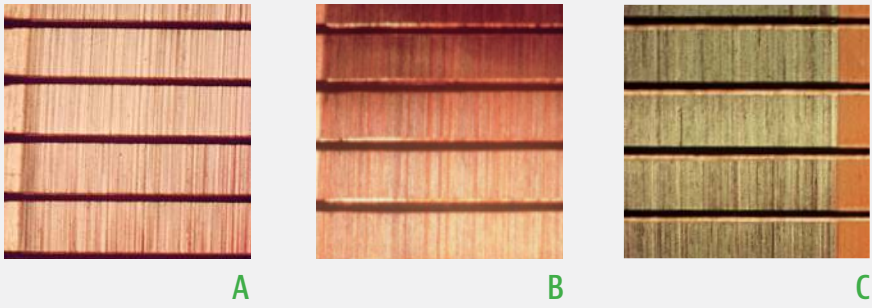


NORMAL SKINS, COLOUR INTENSITY



Good skin formation.
Uniform, light brown **A** to darker brown **B** – **C** (light grey).
The machine and brushes are working well.

PATCHINESS DUE TO MECHANICAL CAUSES

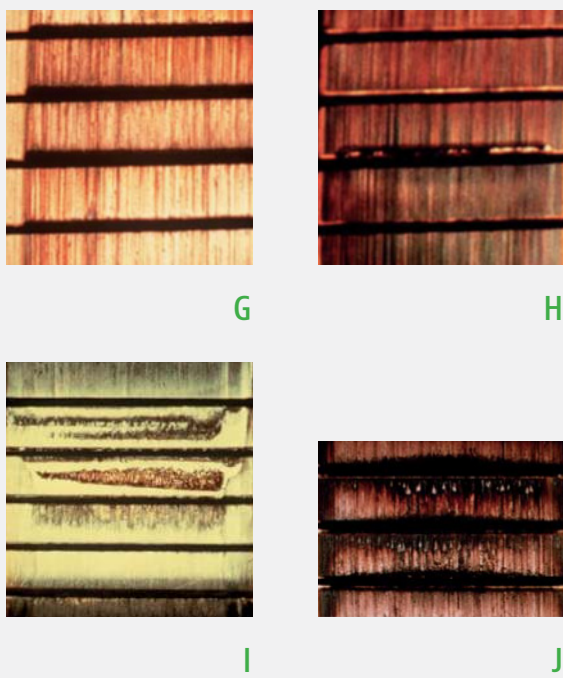


D: Streaky skin.
Lines and bands of varying size alternately light and dark without wear of the copper.
Most frequent cause: excessive humidity, oil vapors and aggressive gases in the atmosphere – under loaded brushes.

E: Raw grooved skin.
As **D**, but with bands of the color of raw copper or very slightly skinned light skin.
The metal is being attacked.
Most frequent causes: the same as for streak skin but more intense or prolonged.
Also the brush grade may be unsuitable.

F: Patchy skin.
Of blotchy appearance having irregular and diverse colorations and dimensions without character of symmetry.
Most frequent causes: commutator deformed or dirty.

BURNING

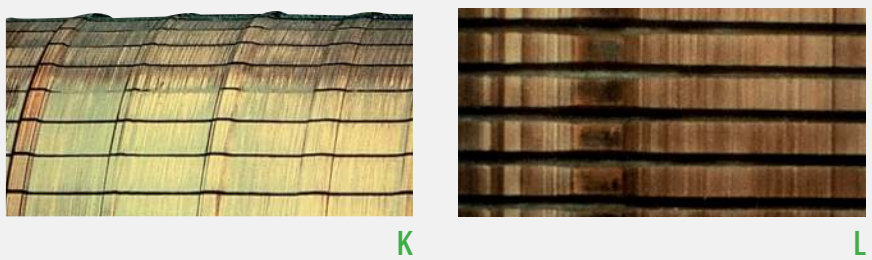


G – H: Metallic erosion, burning and dark patches at edge of bar due to the degree of sparking.

I: Metallic erosion (burning) at center of bars.

J: Pitted skin.
Small clear, light spots of variable number and random distribution over a normal skin.
Cause: sparking under the brushes.

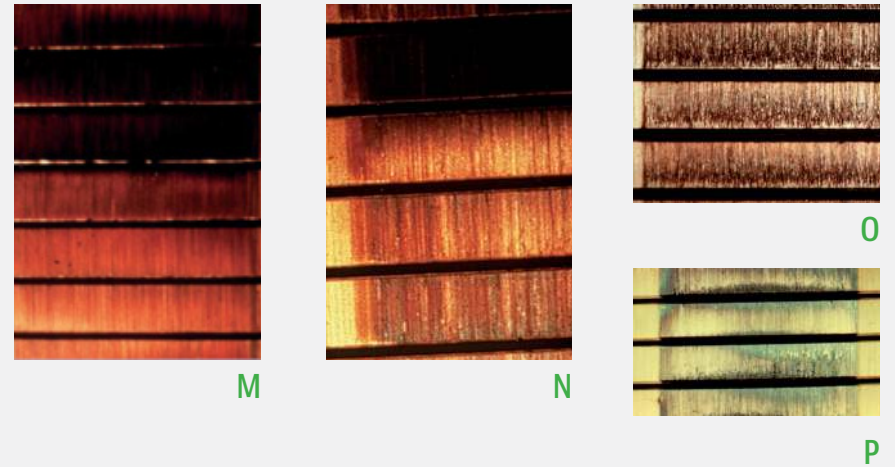
COMMUTATOR WEAR



K: Commutator with axial profile showing track growing with correct stagger.
This wear may appear after a very long period of operation (quite normal).

L: Commutator showing abnormal wear of the metal through incorrect stagger, or grade unsuitable of various atmospheric pollutions.

ASPECT OF SKIN DEPOSIT

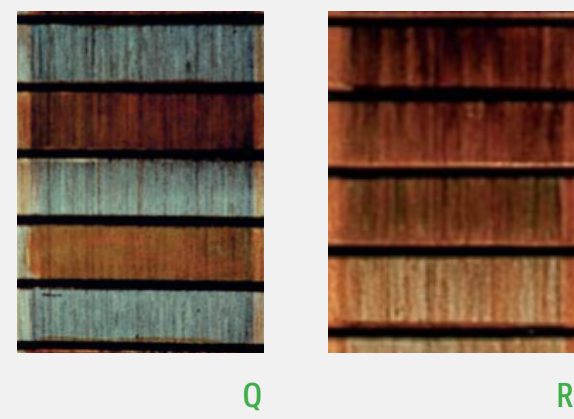


M: Isolated or regularly distributed blotches. Dark blotches having blurred edges.
Most frequent causes: commutators out of round (isolated blotch) or out of balance (vibrations), defective bearings, misalignment etc. (blotches regularly distributed in one or more zone of the commutator).

N: Dark blotches with sharp or irregular edges followed by lighter areas in alternating fashion with gradual reducing intensity of color.
Most frequent causes: a fault affecting one bar or group of bars causing radial movement of the brush (jumps).

O – P: Bars marked at their center or at their edges. Shading at the center of the bar or fringe marking at the edges.
Most frequent causes: defective maintenance of commutator, poorly turned or trued ground.

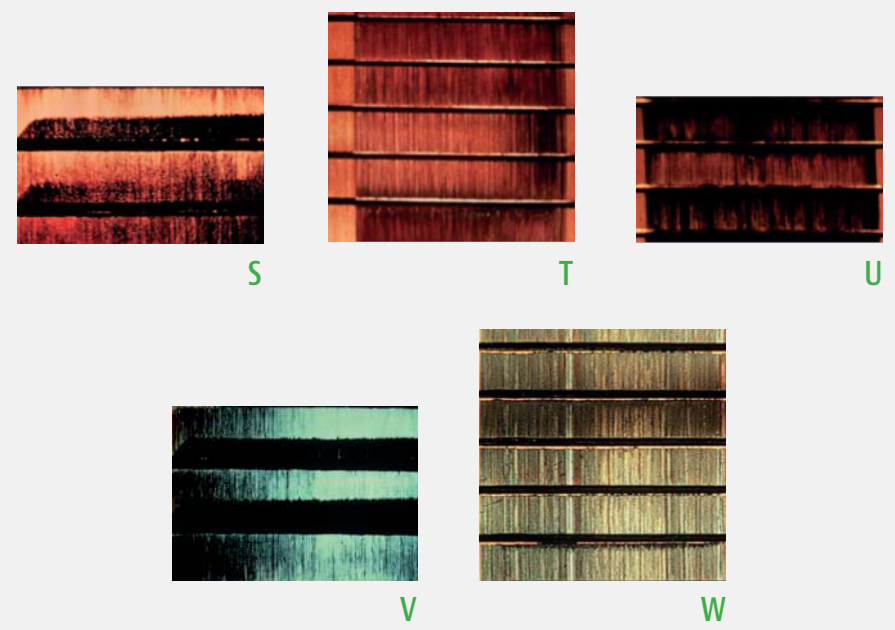
PATCHINESS DUE TO MECHANICAL CAUSES



Q: Alternate bars light and dark.
On each side of a variable number of clear bars the dark bars can be polished, mar or blackened. This characteristic is reproduced all-round the commutator in a repetitive manner.
Most frequent causes: are of electrical origin. They are associated with the armature coils being commutated at successive intervals, the difficulty increasing with the rank of conductors in each slot as in multiplex windings. This can be corrected by the use of a grade having a better commutating ability.

R: Marking at double pole pitch.
Marking is clear or hazy, its color dark, with mat or black appearance, successive markings at double pole pitch.
Most frequent causes: faulty soldering at equalizers, rises or in coils.

COMMUTATOR BAR MARKING



S: Ghost marking (brush image).
A dark or black mark reproducing all or part of the contact face of the brush in exact outline of the commutator.
Most frequent cause: prolonged periods at rest without current or momentary stall of the machine under load.

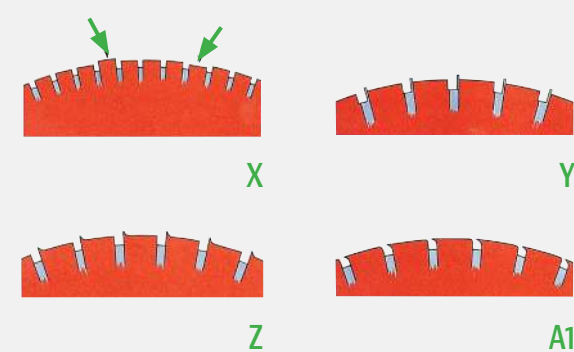
T: Dark fringe due to high bar (see figure **X**).

U: Dark fringe due to low bar (see figure **X**).

V: Dark fringes due to high micas (see figure **Y**).

W: Dark bar edge patches due to copper fins at edge of bars (see figure **Z**).

COMMUTATOR BAR DEFECTS



X: High bar. **Y:** High micas. **A1:** Copper drag.
X: Low bar. **Z:** Copper fins.