

Static Control Best Practices for Converting

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SPEAKER INTRODUCTION

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- Award Winning Engineer:
NFPA 77 Committee on Static Electricity Member
IEEE Fellow
IEEE Electrostatic Processes Committee (EPC) James Melcher Award
Electrostatics Society of America (ESA) Distinguished Service Award
- Successful Business Owner: founded Electrostatic Answers, an engineering consulting company dedicated to eliminating injury and waste from static electricity.
- Inventor: 14 patents and 1 pending applications.
- Accomplished Technical Writer:
Paper Film & Foil Converter, Contributing Editor, writes
“Static Beat,” a periodic column on static control.
Journal of Electrostatics (peer reviewed journal) Associate Editor.

Agenda

1. Introduction / Motivation

- Static sparks can damage products (e.g. release liners).
- Static charges cause cut sheets to stick and jam.
- Static charges attract dust and debris

2. Slitters have 3 “static zones.”

1. Unwinding roll to drive roller.
2. Drive roller to knives.
3. Knives to winding slits.

3. Static control for each zone.

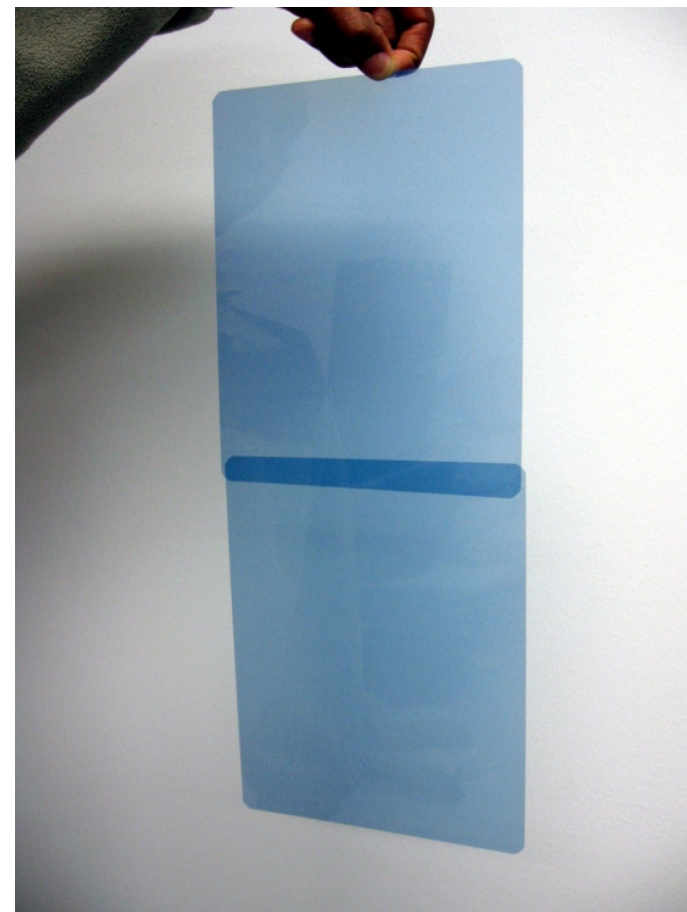
1. Static on the unwinding roll.
2. Static from nipped drive roller.
3. Static from slitter knives.

4. Summary

1. Motivation

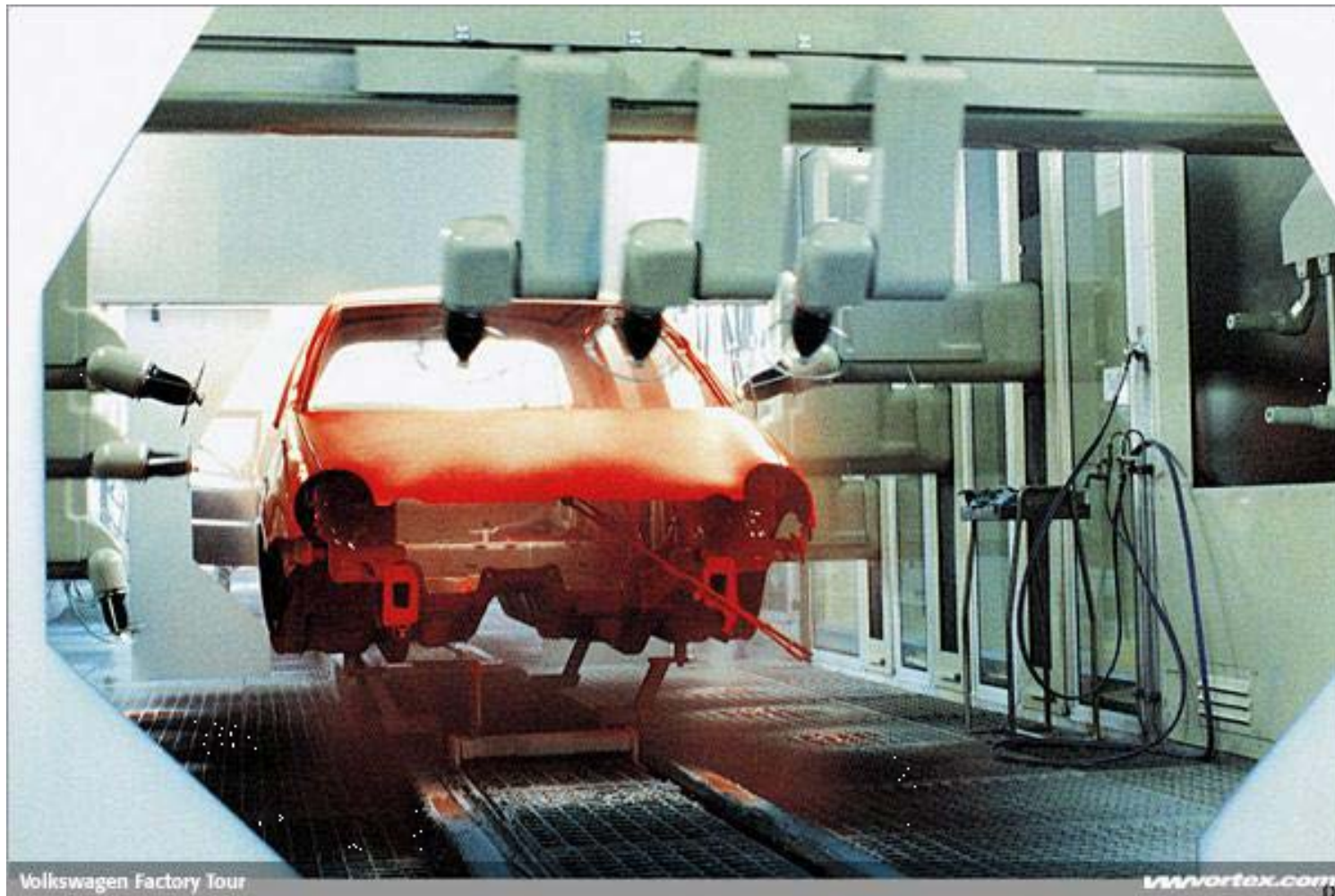


Static sparks can damage the silicone release liner causing release failure (PSA label sticks to liner).



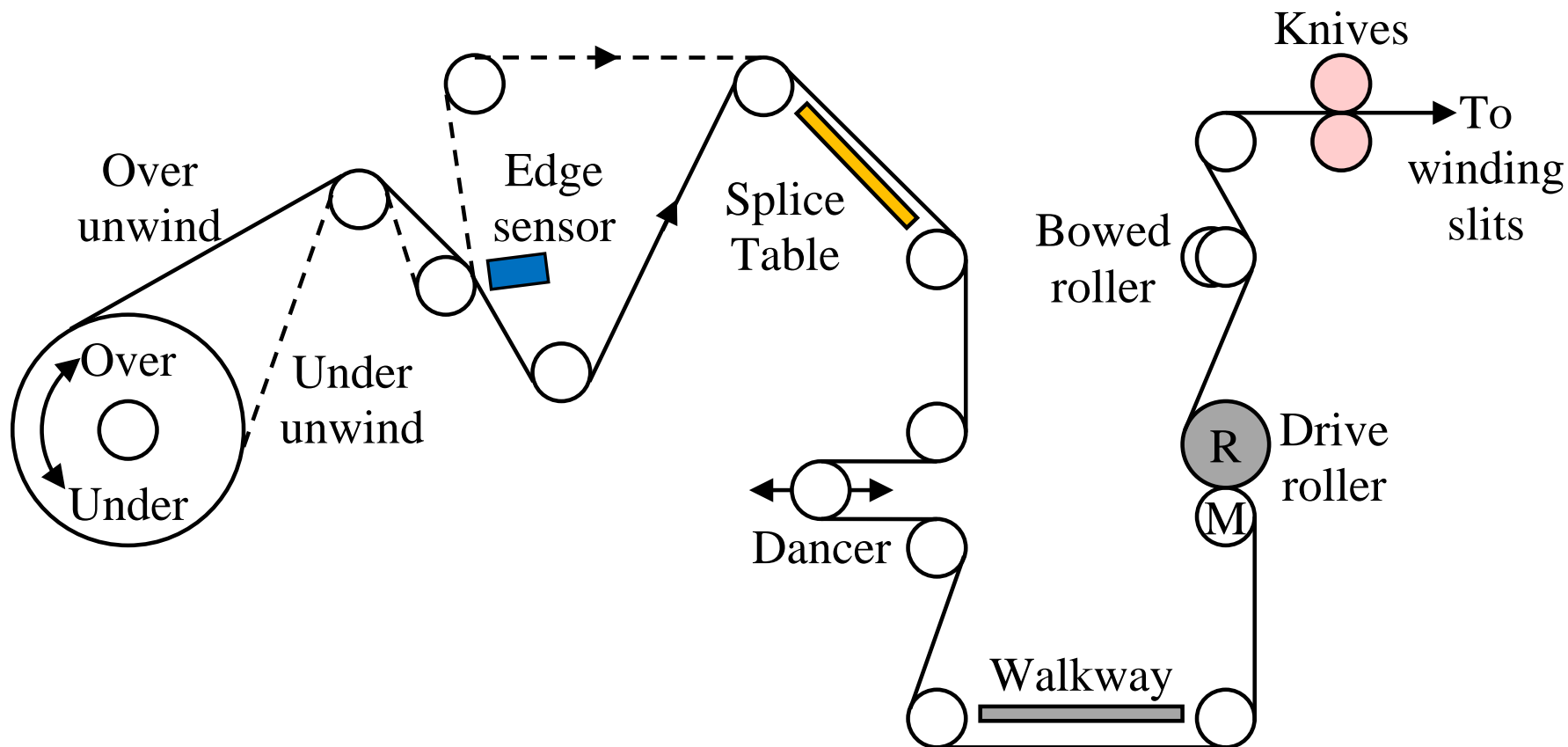
Static charges can cause sheet to stick that jams sheeting and packaging operations.

1. Motivation



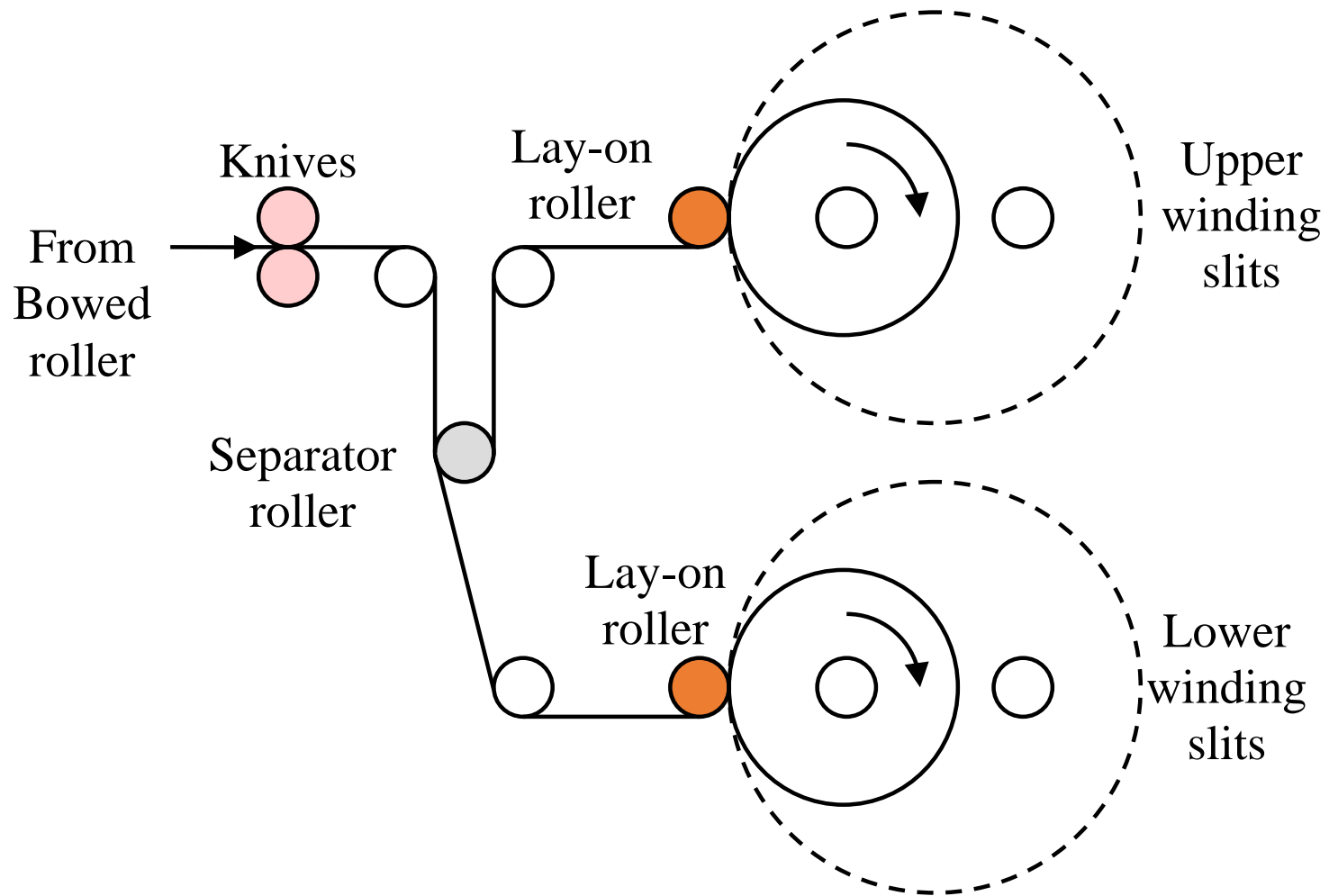
Static charges cause attract paint droplets to grounded metal.
 Static charges on slit webs attract dust and slitter debris.

2. Slitters have 3 zones.



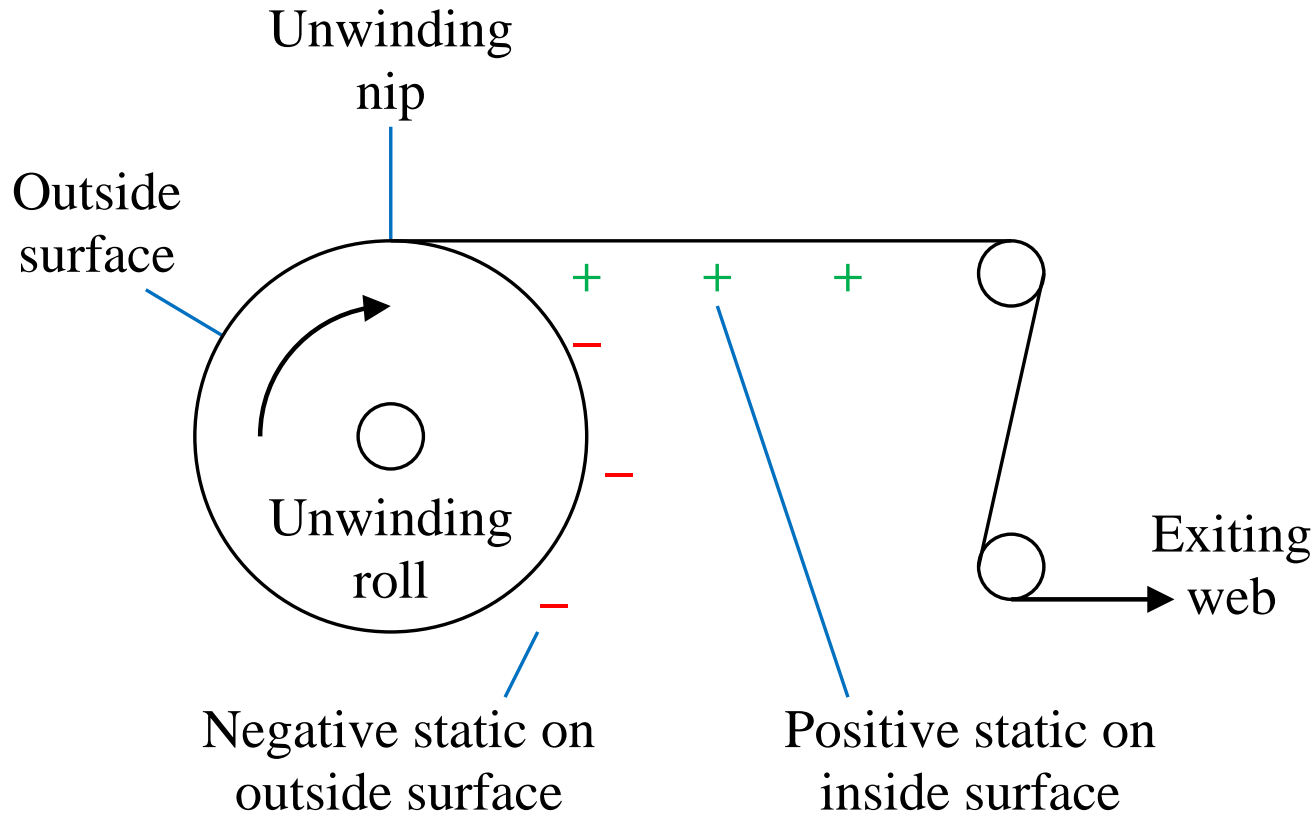
1. Unwinding roll to Drive roller – Deal with static from unwinding roll and dancer.
2. Drive roller to Knives – Dissipate static to minimize slitting debris contamination.

2. Slitters have 3 zones.



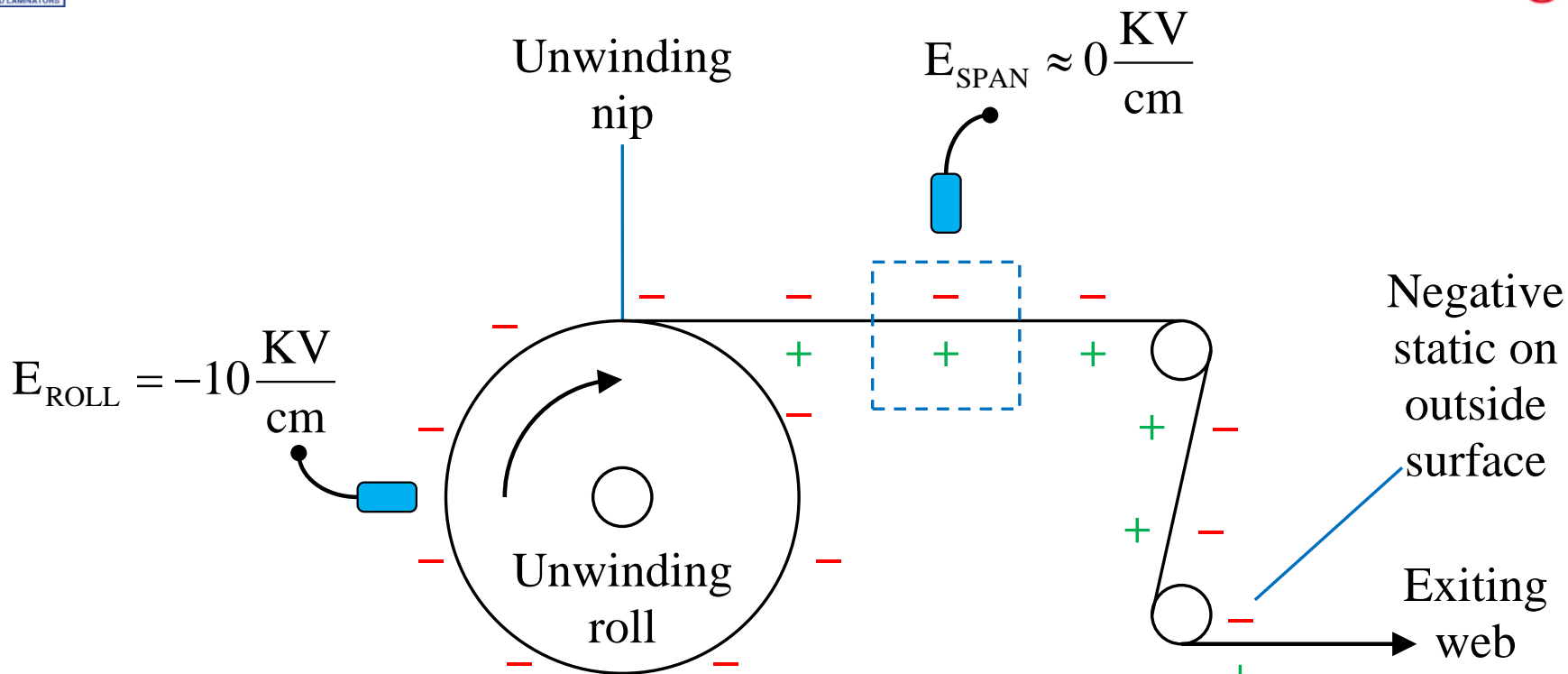
3. Knives to Winding Slits – Dissipate static from knives and lay-on rolls.

3. Unwinding roll to Drive Roller



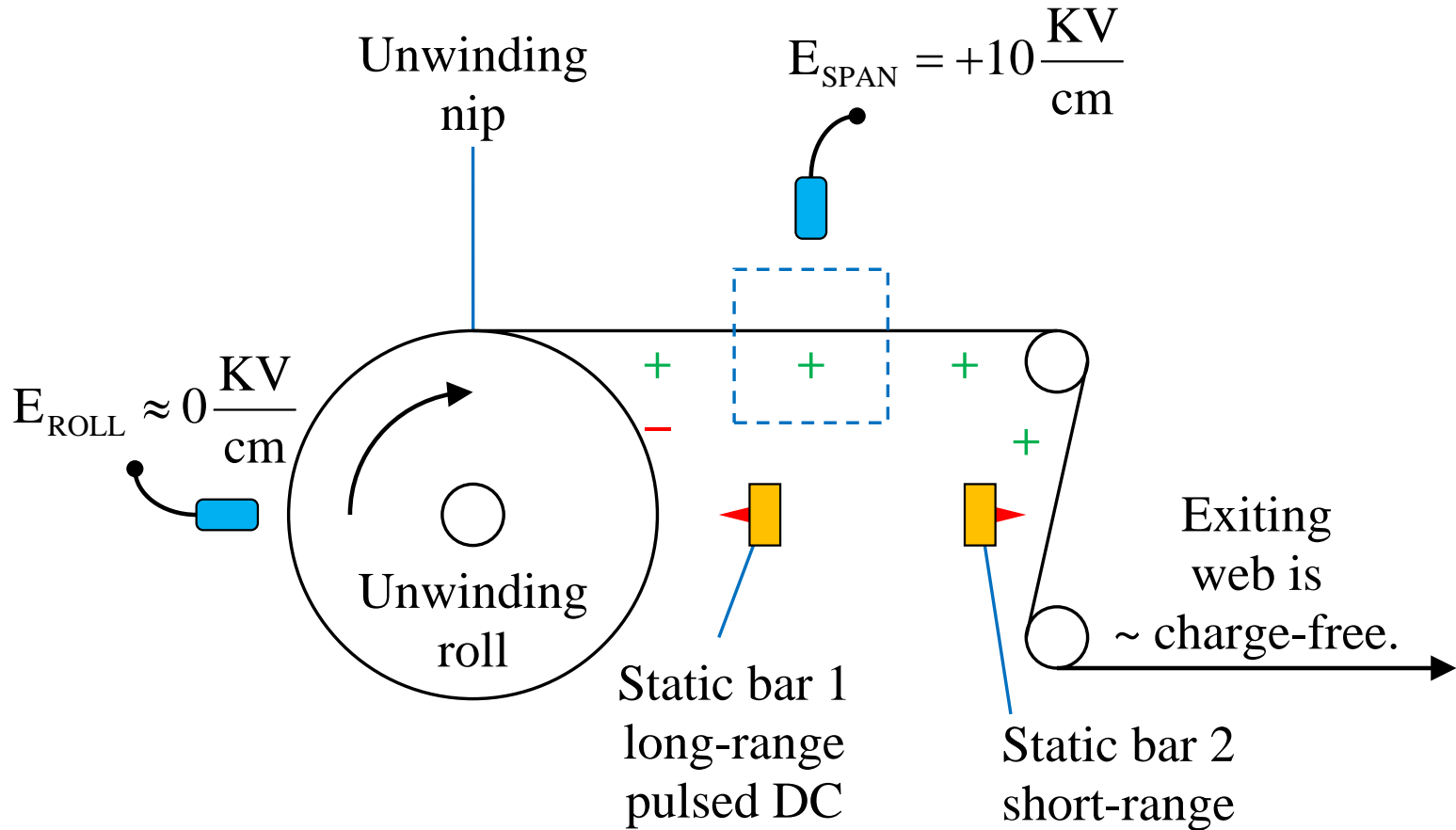
At the unwinding nip, the inside surface of the web peels from the outside surface of the unwinding roll.

3. Unwinding roll to Drive Roller



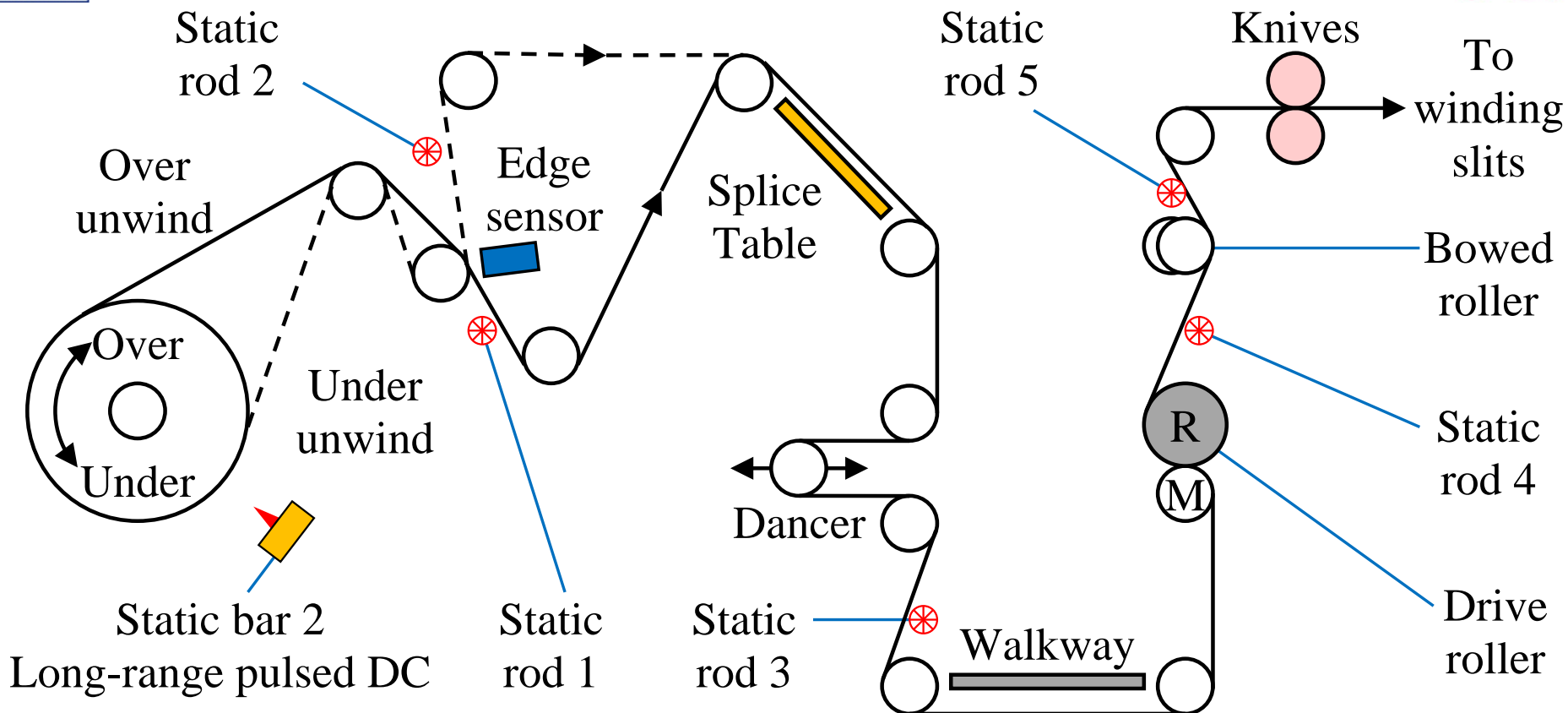
In steady state, the outside surface of the roll has negative charge and the exiting web carries balanced charge.

3. Unwinding roll to Drive Roller



Two static bars are needed to neutralize static on both sides of the web exiting the unwinding roll.

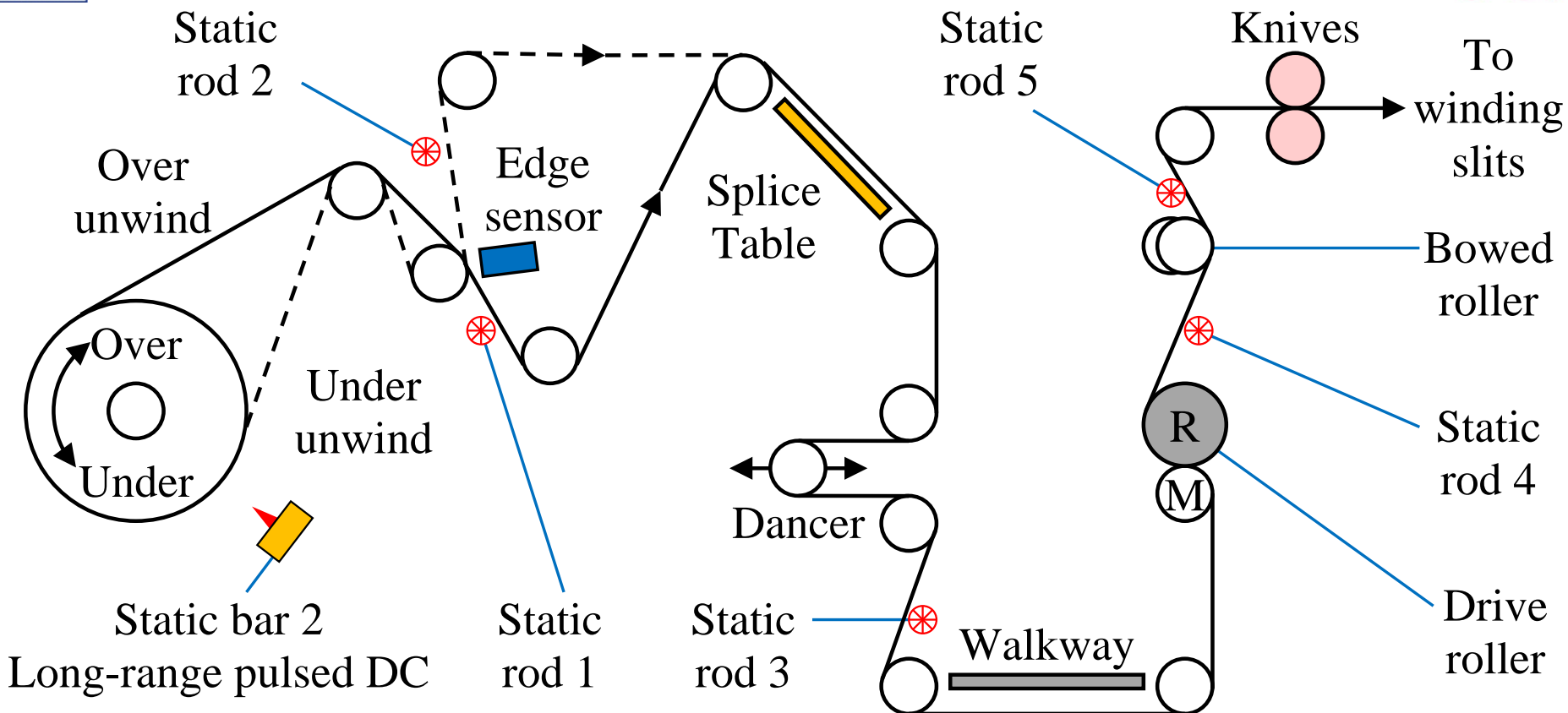
3. Unwinding roll to Drive Roller



Goal: Deal with static from unwinding roll and dancer.

1. SB1 dissipates outside surface of unwinding roll.
2. SR1 dissipates inside surface when over unwinding.
3. SR2 dissipates inside surface when under unwinding.
4. SR3 dissipates static from Dancer.

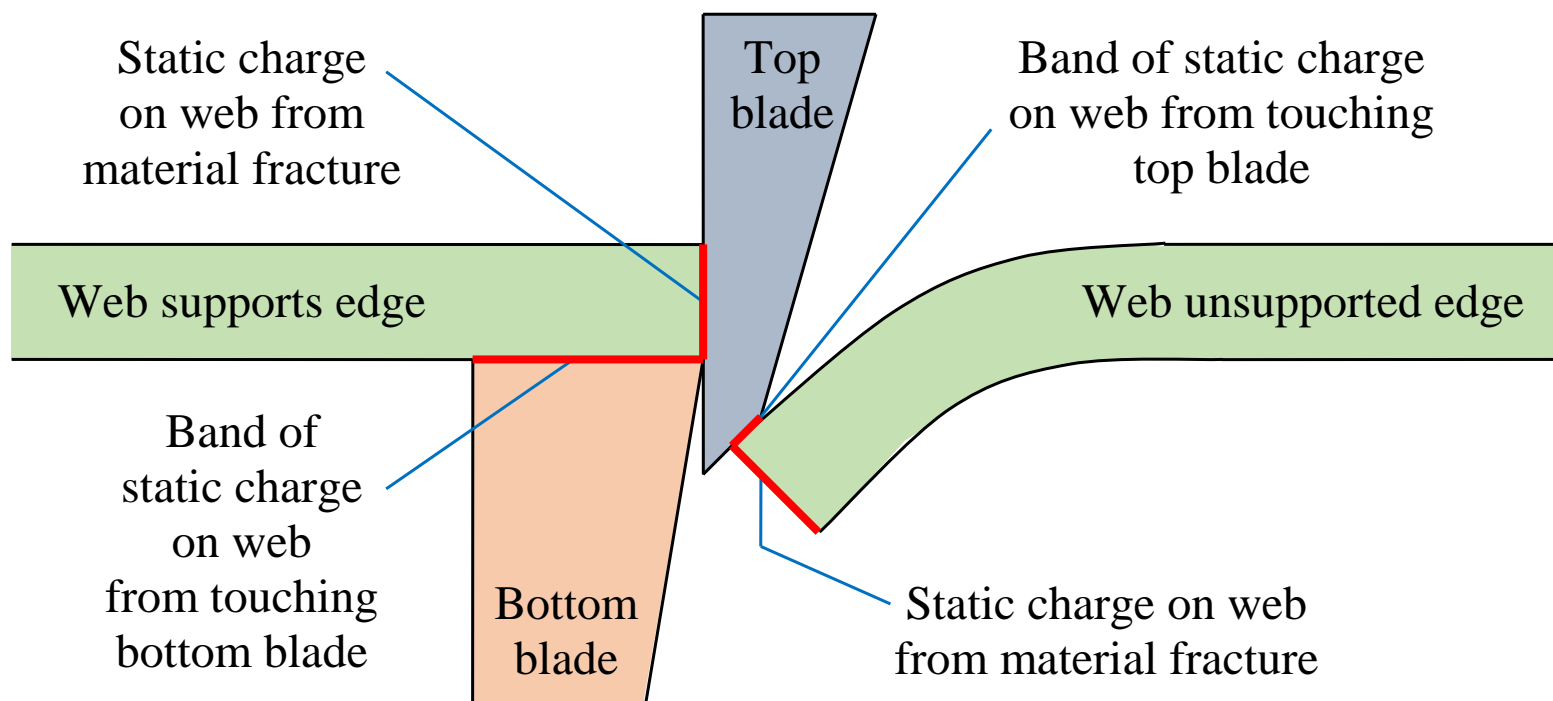
3. Drive roller to Knives



Goal: Minimize slitter debris contamination.

5. SR4 dissipates static from Drive roller.
6. SR5 dissipates static from Bowed roller.

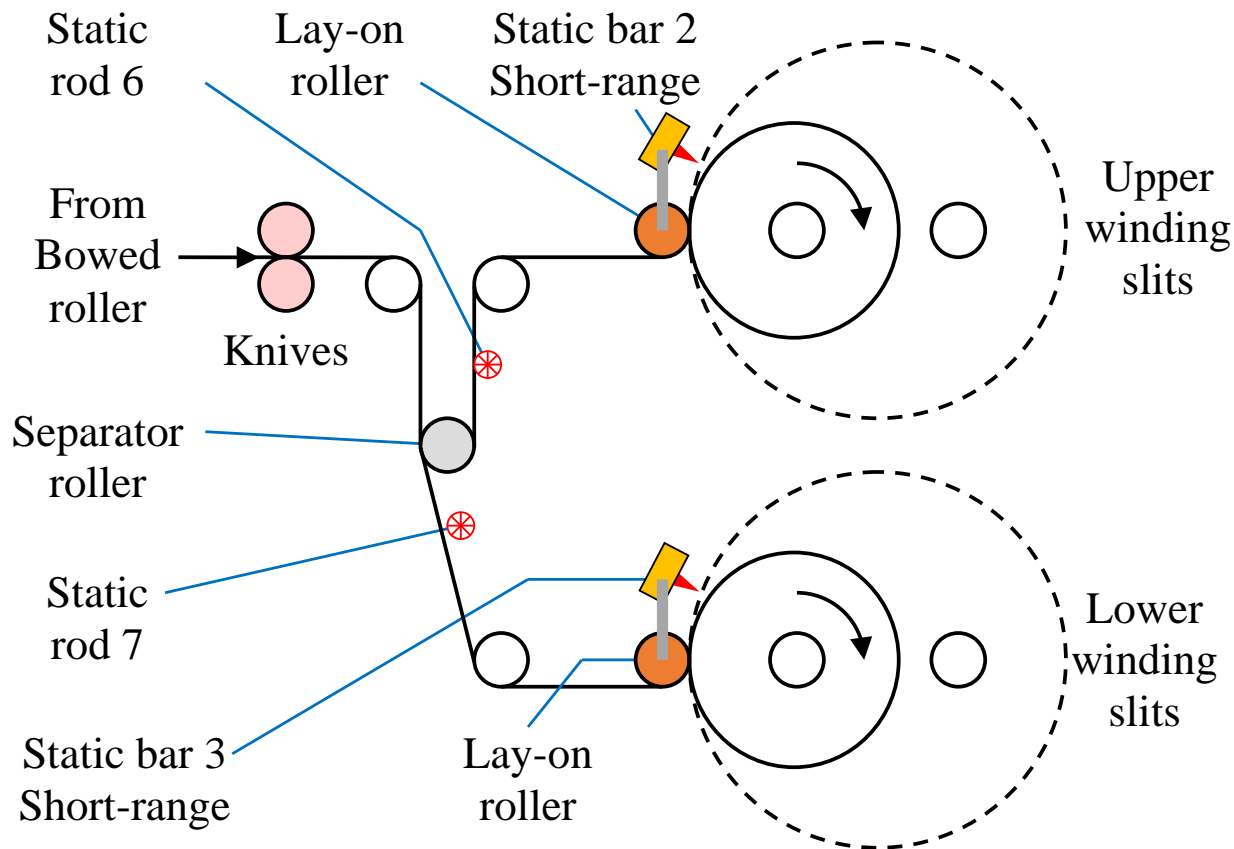
3. Knives to Winding Slits



Webs exit knives with charge for at least 2 reasons:

1. Tribocharging between web and blades.
2. Static separated by material fracture. Breaking molecular bonds can separate large amounts of static.

2. Drive roller to Knives



Goal: Dissipate static from slitter knives and lay-on rollers.

7. SR6 dissipates static from knives on ribbons to upper slits.
8. SR7 dissipates static from knives on ribbons to lower slits.
9. SB2 dissipates static from lay-on roller on upper slits.
10. SB3 dissipates static from lay-on roller on lower slits.

Summary

- Static sparks can damage products (e.g. release liners).
 - Static charges cause cut sheets to stick and jam.
 - Static charges attract dust and debris
- 1. Slitters have 3 “static zones” each with different goals.**
 1. Unwinding roll to drive roller.
 2. Drive roller to knives.
 3. Knives to winding slits.
 - 2. Dissipate charges at sources to wind charge-free slits.**
 1. Three (3) active static bars are needed to dissipate static on the unwinding roll and on the winding slits.
 2. Seven (7) passive static rods are needed to dissipate static from sources of static charging on the slitter.

THANK-YOU!

Questions?

Comments?

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