



As you can see from the image above, air bubbles and contaminants can cause serious issues when trying to pin or combine multiple webs. In the case of the manufacturer above this would result in a massive 1 in 25 failure rate.

“Both parts of the webs are combined in the Liner machine, where the rubber and fabric webs are laminated together. After the lamination process trapped air problems are apparent between the two layers. The air within the liner is thought to be caused by inconsistencies in the adhesion process”

The Result:

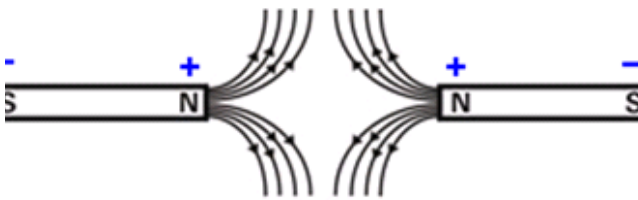
The liner in “sewing machines” have to be manually monitored and the work around involves physically drilling holes, which not only means a waste of man power and time, but it also generates C6 scrap at the same time.



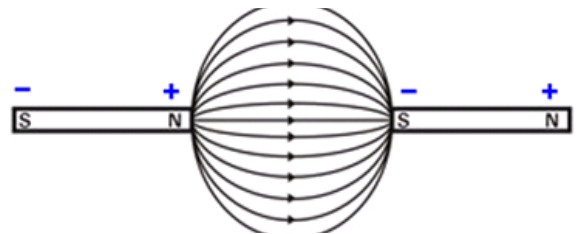
Trouble shooting:

In the readings taken during research into the poor adhesion problems of the Liner it was noted that the compounds in the screws reacted from the entrance of the screw. This was measured and recorded at up to -170 kV. This is a substantial amount of negative static electricity.

During measurements it was also noted that both webs have a significant negative charge and would therefore have a tendency to repel each other rather than band together as is required for the process to work.



The Same Charge Repels



An Opposite Charge Attracts

Levels Recorded at Machine exit -170 KV

Levels recorded on the attachment band -45 to -130 KV



MULTIPLE WEB CASE STUDY

TYRE MANUFACTURING AIR BUBBLE AND ADHESION ISSUE

Suggested Solution:

To stop the poor web adhesion problem and therefore solve the trapped air issue, the customer elected to use:

2 static generators: 0-50 KV 1,2 mA (one Negative and one Positive)

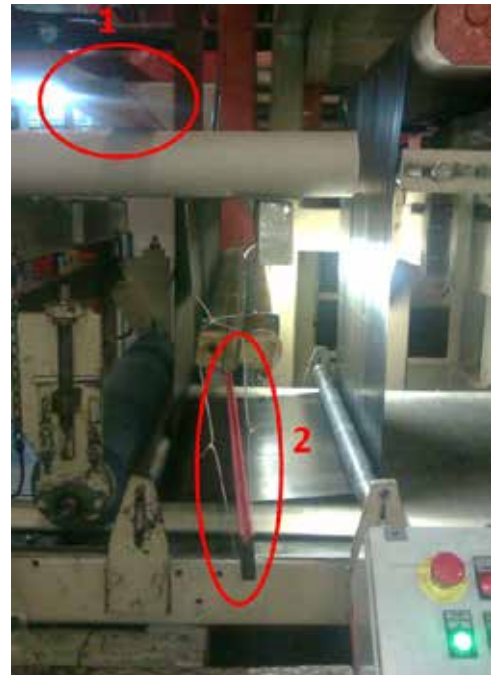
2 charging bars (7150): 10 mm spacing and 50 KV



Implementation:

Using an applied voltage of -50 KV at the number 1 charging bar, static electricity was loaded on to the liner material facing the electrode.

In the same way, +50 KV was loaded at number 2 charging bar, static electricity was loaded on to the liner material facing the electrode.



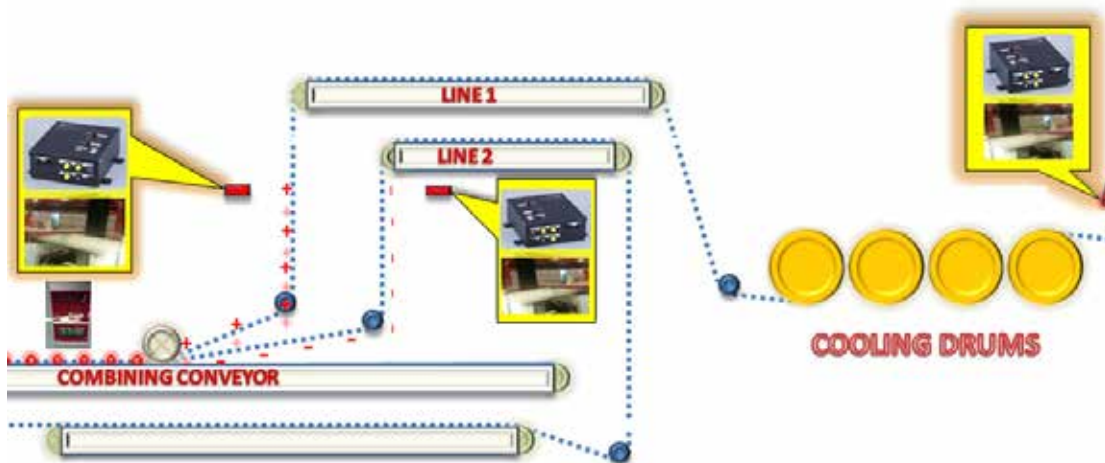
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Result:

An electrical attraction was created between the Liner compounds by charging one electrode positively and the other negatively.

Air problems are no longer visible in liner coils which have passed through this process.



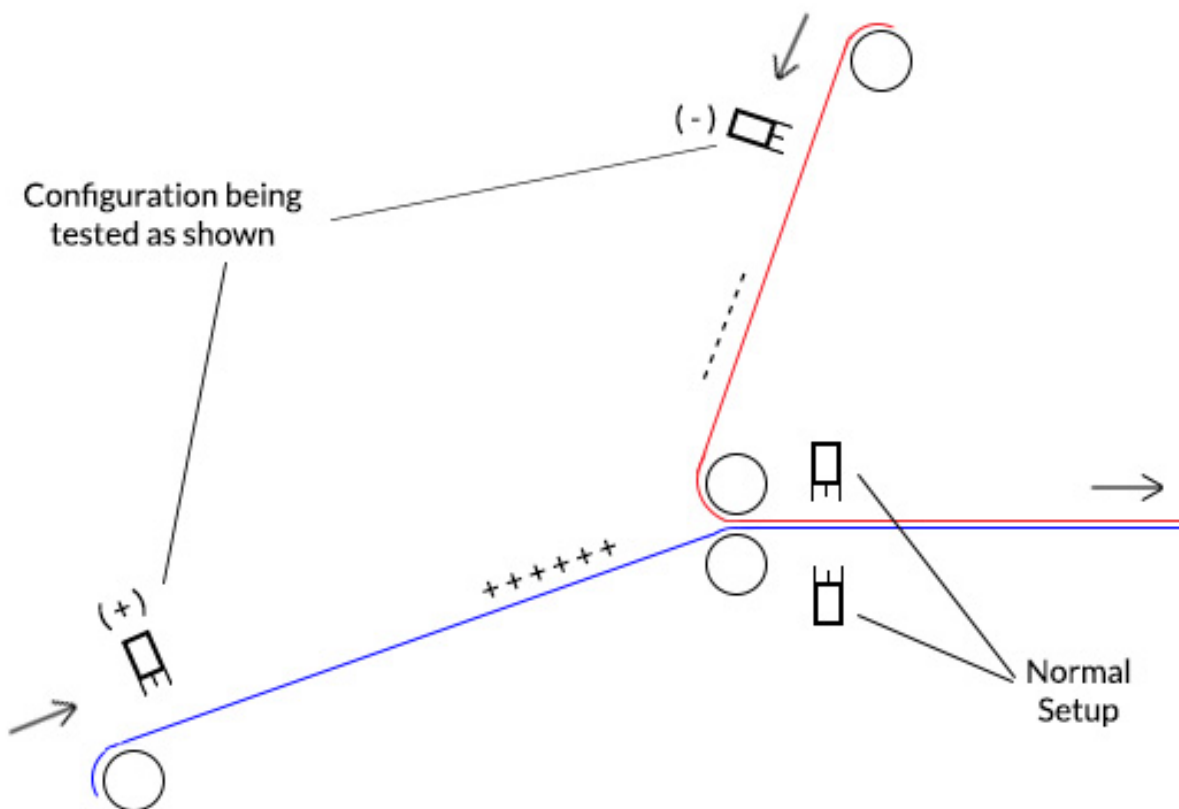
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The issue you have just seen is a common one especially when dealing with rubber or plastics and while the implementation is far from our suggested ideal, there are often “real world” issues involved which mean that location of static control or adhesion equipment cannot always take priority without massive and expensive reconfiguration.

This is why Fraser Anti-Static Techniques have developed a market leading selection of long range and short range DC and AC bars, static control, air and adhesion equipment, which are ideal for any situation. Our worldwide expert team of distributors will ensure that no matter what your static issue is, you will receive the best possible advice and solutions.

Our suggested setup for pinning multiple webs is available at the end of this document.



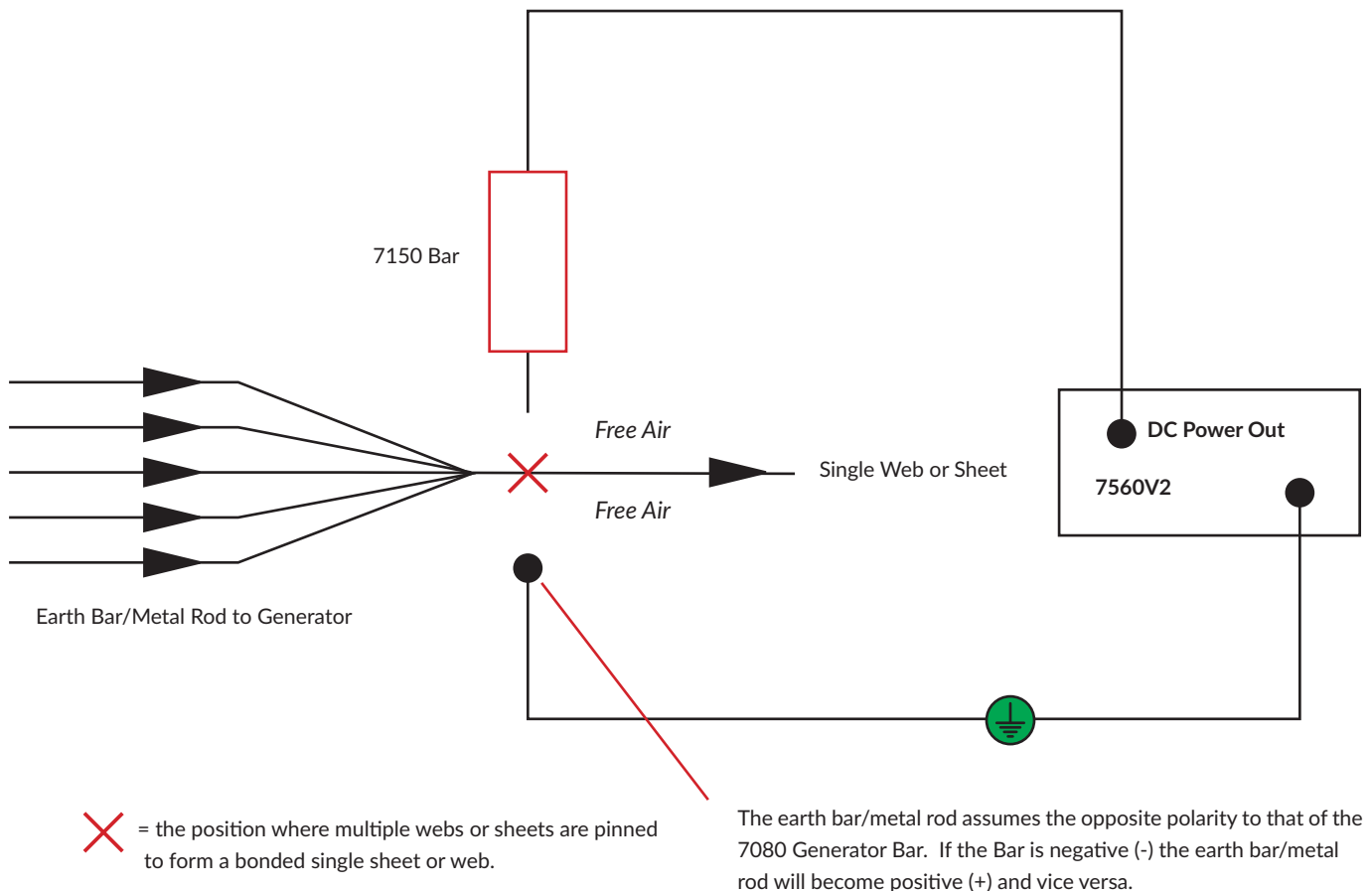
MULTIPLE WEB CASE STUDY

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DC Generator Bars Model 7150 can be used to adhere (pin) two or more webs together, expelling trapped air and producing a long lasting bond that allows easier processing further down line.

In some cases using a single polarity generator bar and a proximity earth is enough to produce the desired effect, but not for heavy duty applications such as tyre rubber and fabric.

Choosing the desired polarity of the generator is influenced by the position of the material on the triboelectric scale. If pinning materials from both sides then you can select either polarity generator.

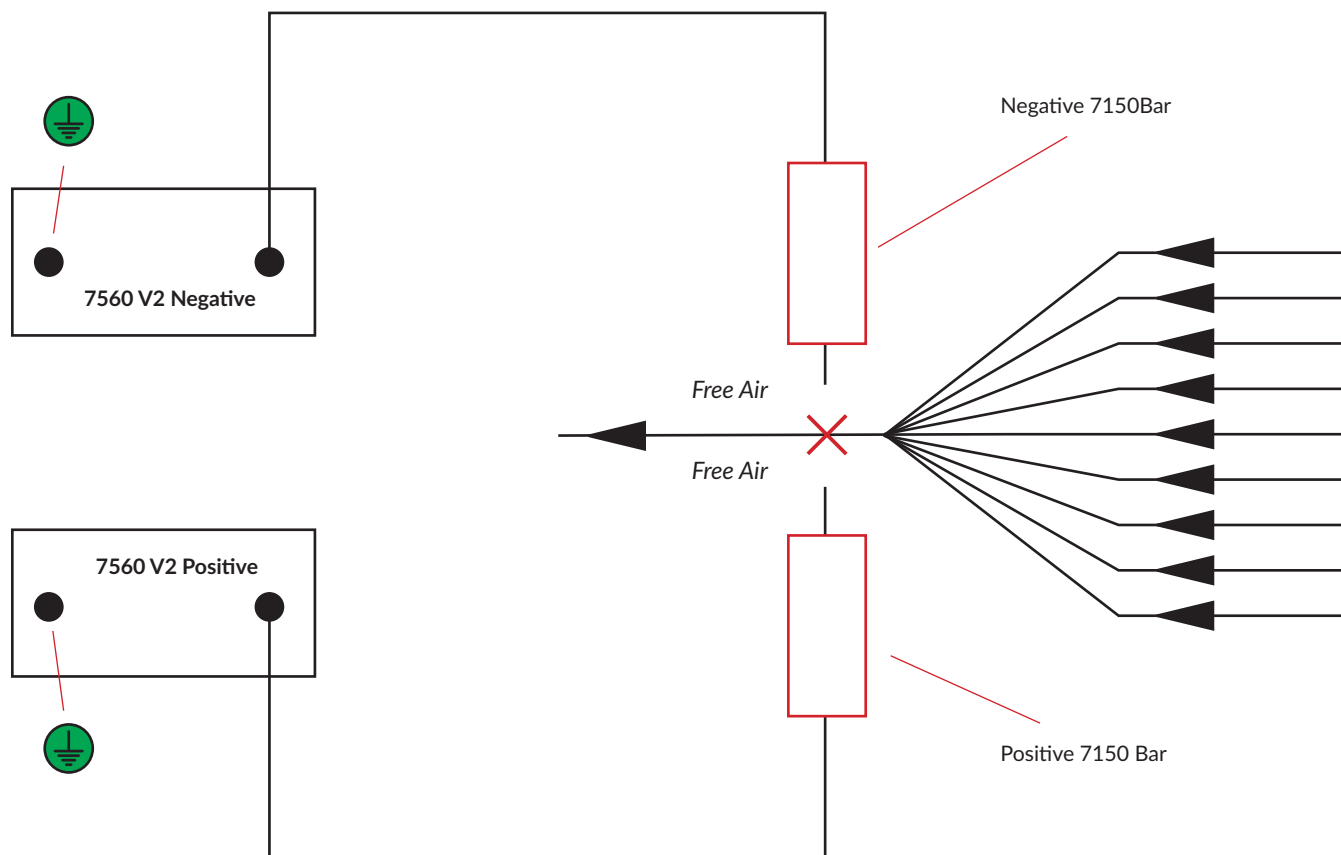


continued over.

MULTIPLE WEB CASE STUDY

TYRE MANUFACTURING AIR BUBBLE AND ADHESION ISSUE

Where multiple webs (more than two) or thicker materials require bonding the use of one a single powered bar and proximity earth may not be powerful enough - however replacing the earth bar with a powered generator bar of the opposite polarity to that of the original bar can double the power and the pinning capacity.



X = the position where multiple webs or sheets are pinned to form a bonded single sheet or web.