Case Study #54 – Packing Fiber 'Hair', Output

The Circumstance:

The product is a packing fiber used as a woven gasket sealant. The problem is 'hairing' during processing. Hairing is where small fibers come loose from the strands. This slows down processing either by deliberate equipment slowdowns to counteract its effect or by stoppages due to actual entanglements. The mission is to substantially decrease hair so that productivity and output can be increased.

The Approach:

In a brainstorm session, 127 'anything goes' ideas are procured to remedy the problem. Each of these is reviewed and 15 of them are deemed doable immediately (on shippable goods.) The ideas span all processing steps, being slight changes in things like speeds, amounts, times and temperatures. All tested ideas are zero cost to test and implement as well.

An experiment is designed which calls for 32 treatment combinations. Doing these enables us to learn about 32,000+ combinations of these idea's settings, along with 105 two-factor interactions between them. (A two-factor interaction is where the influence an input has on an output is dependent on the setting of another input.)

Over the next few weeks hundreds of rolls are produced under these 32 experimental combinations. 'Hairing' during this time is less than before the experiment, and output is up as well.

The Outcome:

Once all experimental runs are complete, analyses are performed to determine the impacts of the 15 factors on 9 metrics of product & process performance. One factor emerges as highly influential on hairing with four others also statistically significant. The most influential is counterintuitive to common logic regarding its potency. A newly prescribed SOP, based on experimental findings, is immediately implemented (only readily implementable solutions were tested, so this could be easily done.) The extent of 'hairing' is forecast to be cut in half and this is immediately obtained. Output correspondingly increases by 40% +.