

# Case Study #52 – Fiber Breaks, Output

## The Circumstance:

The product is a relatively new extruded fluoro-polymer fiber. The problem is fiber breakage during processing. Breakages cause costly and frustrating stoppages that require rethreading of equipment. The mission is to reduce or eliminate breaks so productivity and output can be increased.

## The Approach:

In a brainstorm session, 96 ‘anything goes’ ideas are procured to remedy the problem. Each of these is reviewed and 25 of them are deemed doable immediately (on shippable goods.) The ideas span the entire set of product processing steps, being slight changes in things such as temperatures, times, pressures, speeds, etc. All tested ideas are zero cost as well.

An experiment is designed to accommodate these 25 factors. This calls for 64 treatment combinations. Doing these enables us to learn about over 33 million combinations of these idea’s settings, along with 300 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 a few hundred units are produced under these 64 experimental combinations. During this time, breaks go up slightly and output goes down slightly.

## The Outcome:

Once all experimental runs are complete, analyses are performed to determine the impacts the 25 factors have on five different key metrics of product & process performance, including breaks. Two factors in particular emerge as influential regarding breaks. One is highly counter-intuitive to common logic. A newly prescribed SOP based on these new findings is implemented immediately (only readily implementable, solutions were tested, so this could be easily done.) A reduction in breaks to approximately one fourth of their pre-experiment average is forecast and immediately obtained. This more than doubles output.

