

Film Data Analysis

Case – How to improve the quality of stretch films?

As a quality assurance engineer, understanding the quality status of the products our plant produces is important. Our company wants to know what factors will affect quality during the process. When the quality was improved according to the analysis below, production shipping quality can potentially increase by.

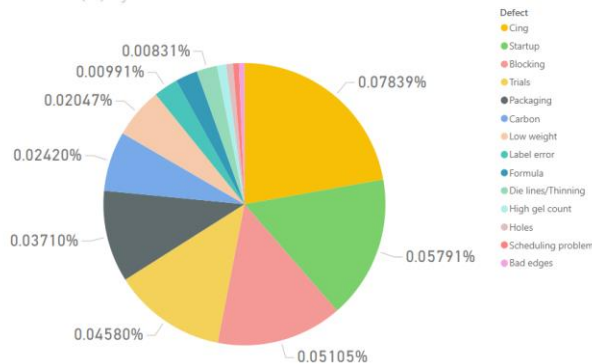
What kinds of products do I analyze for stretch film?

Machine film is the main product in our plant. It is one kind of stretch film which is used for high-speed equipment and applications that require films to pre-stretch over 300%. The specs of machine films are very different from hand films and they will be more serious.

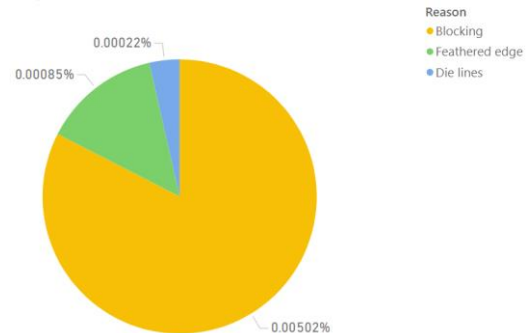
What quality problems do CFP have and where it got reports?

In 2020, our company got defect reports both from production and customers. One is production that finds some defects or is concerned with products before sending to customers, the other one is complaints by customers after using products. Hand Cling (40K, 0.0783%) was the main defect from production, and blocking (0.00502%) was the main complaint from customers.

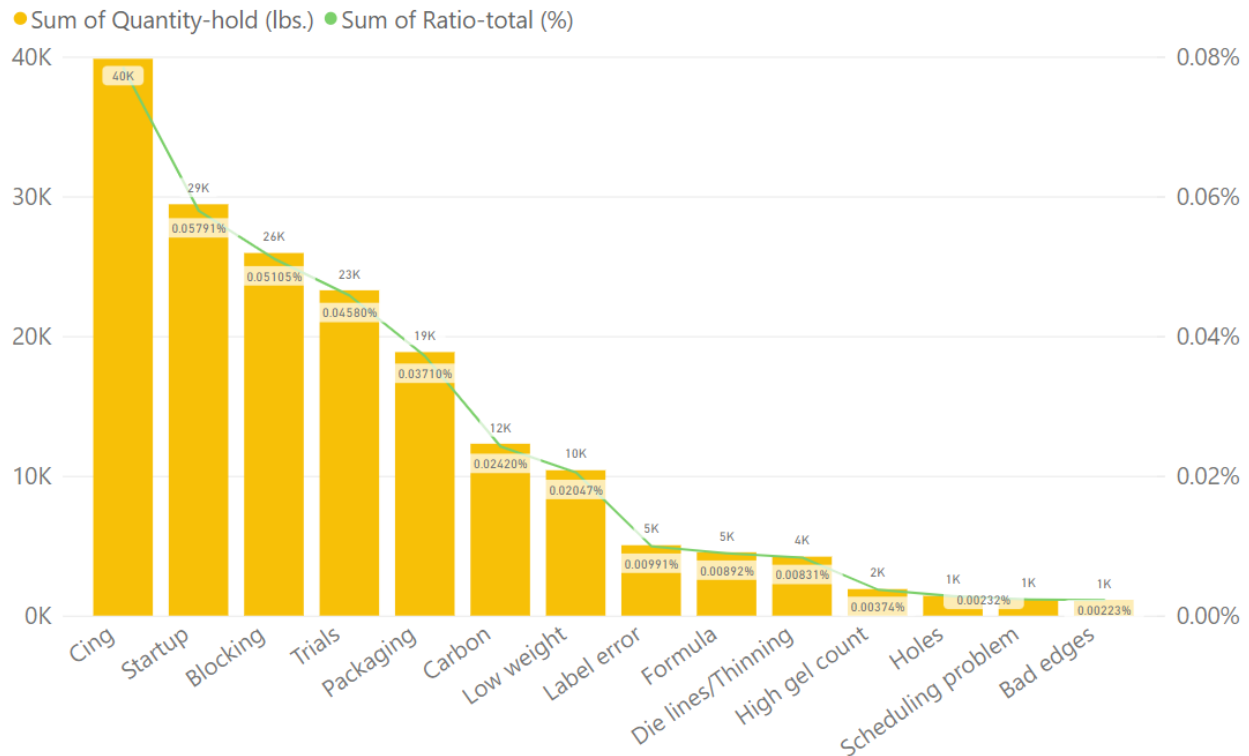
Claim ratio (%) by Production



Claim Ratio (%) by Customers



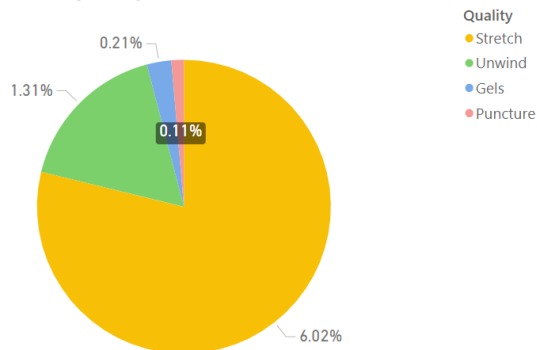
Quantity-hold (lbs.) by Defect



What are the potential reasons for quality defects?

Except for material problems, we found out line speed, output, vacuum, temperature, and seasons can be the possible process reasons to influence quality. Also, we noticed that packaging and label error are not low (24K lbs), we can assume that human error is one of the impacts.

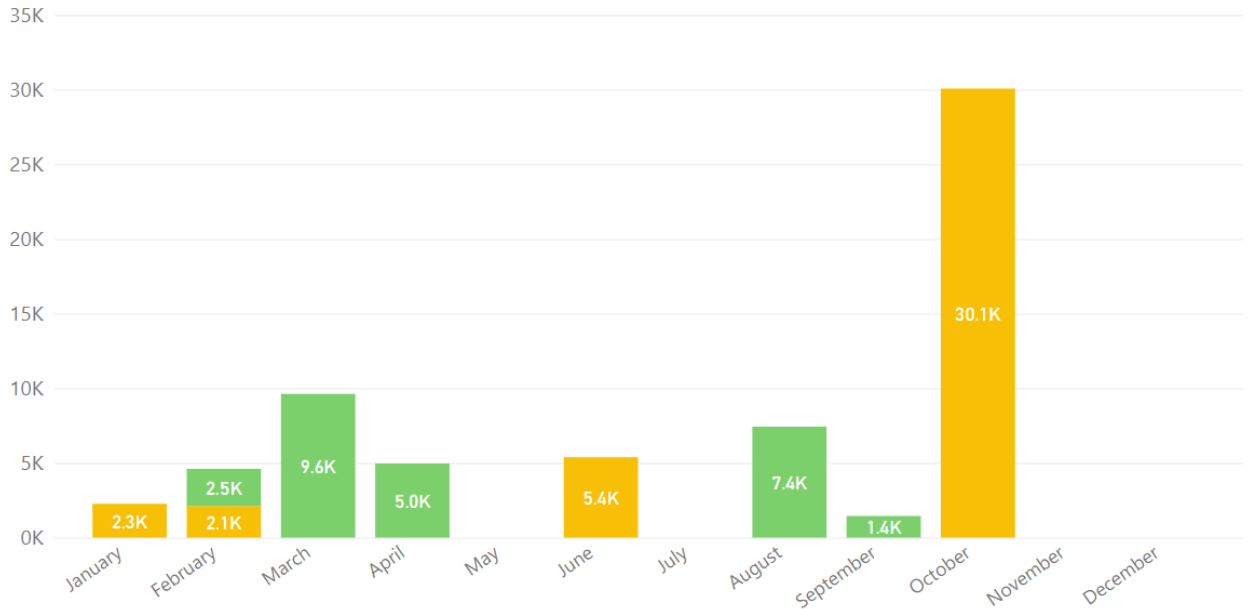
Out of spec ratio (%) by Quality



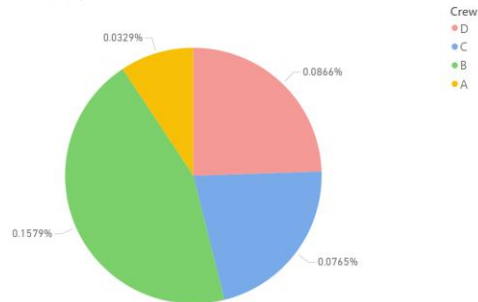
After analyzing the numbers of out of spec on products from quality testing data, it did show stretch values have the highest ratio of out of spec. Even though not every out of spec will cause quality, it did match with cling, blocking problems from production and potential breaking problems from customers.

Cling and Blocking Quantity (lbs.) by Month

● Cling Quantity (lbs.) ● Blocking Quantity (lbs.)



Sum of Ratio-total (%) by Crew



1. Cling and blocking are related to seasons and unwind values that films are stickier during summer (Aug, 7.4K lbs.) and the time temperature increases (March, 9.4K lbs.), so we can see cling problems increase when the temperature is going to get cooler in October.
Solution: Adjusted the ratio of cling resin when changing seasons.
2. Stretch has the highest out of spec ratio (6.02%) in quality values which has probability to break when customers use it.
Solution: one of the main factors is vacuum, we can use that to improve stretch values.
3. Human error is also from both production and customer complaints.
Solution: Shift leads should make sure operators and packers are followed by sops , especially B crew (0.1579%).

By applying the above solutions, production shipment can increase 0.18% (90K lbs.) and save potential breaking problems by 6.02%.

Which production line is more effective?

There are three different machine lines that produce this type of film. All three lines have small differences with each other which may affect the film quality. Line 7 and line 8 are very similar, both of them have 4 extruders and installed at the same time. Line 10 is the newest one that only has 5 extruders and unmoving chill roll.

Line 7 here shows that it tested the largest numbers of samples, but has the lowest out of spec ratio (6.57%).

Out of spec ratio (%) by Line

● Stretch ● Puncture ● Gels ● Unwind ● Samples

