

TIP FROM TECHNOLOGY

Importance of Film Slitting

Film slitting is critically important in film production, especially with state-of-the-art tough films. When performed well, slitting can provide smooth winding and less wrinkling of film. However, poor cuts can generate a series of many negative effects.

Through the constant friction between a film and the blade edge, the film can have a tendency to elongate along the cutting edges. In severe cases, the edge of the film may look like the edge of a postage stamp. As this elongation persists, the film material can accumulate along the edges of a reel during the winding process. This accumulation may cause a difference in peripheral velocity between the reel edge and the rest of the reel, thus causing subsequent problems in converting and printing applications such as production stops.

Poor slitting quality can also generate dust particles that may cling to the film and prevent the film from being used in printing or clean-room applications. Furthermore, a poor blade may need more frequent replacement increasing the inherent safety risks associated with the changing of blades.

It would seem that much of the slitting performance hinges on the type of blade that is chosen for cutting. Therefore, we initiated a study on film slitting to confirm the impact of blade choice on slit quality. This test was conducted jointly by ExxonMobil Chemical and the company Eddy Callier, the maker of the Fortisblades.



The Test

Our test was conducted at our European Technology Center in Brussels, Belgium, and supervised by our Processing Application Converting Technology (PACT) team and a quality controller from Eddy Callier. We compared the slitting performance of three razor blades and one Fortisblade on a monolayer of metallocene-catalyzed linear low density PE film over a period of five hours. Every hour throughout the five-hour period, the edges of the blades and samples of the film were inspected.

Test Specifics

Product: A monolayer extruded blown mLLDPE
25 micron thickness
2 g/10min melt index
0.918 g/cm³ density
5% LDPE was added for enhanced optical properties

Line Speed: 56 m/min (184 ft/min)

Output: 125 kg/hr (276 lb/hr)

Blades:

1. All-purpose razor blade
2. Standard industrial blade
3. Tin-coated industrial blade (copper-color edge)
4. Fortisblade (black color edge)

Thickness of all blades: 200 µm

Four blade holders carrying different blades are lined up for test



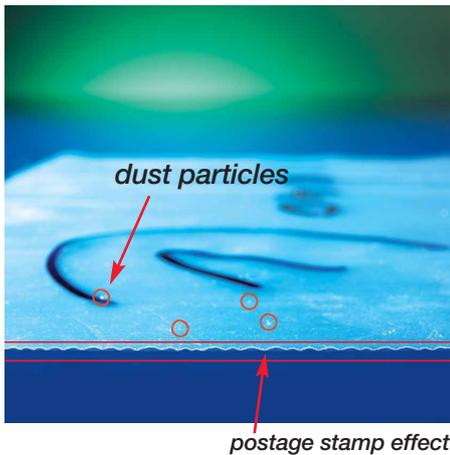
The Results

The films cut with the different blades were inspected with a microscope for the presence of dust particles and visually inspected for the “postage stamp” effect on the edge.

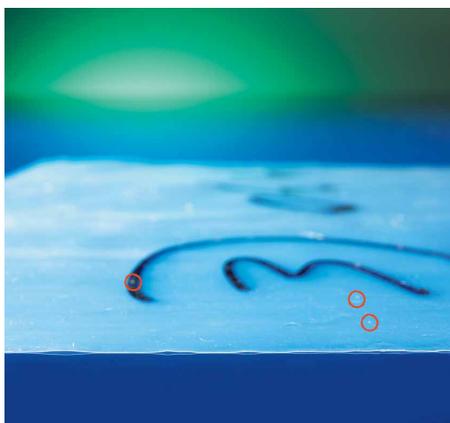
After five hours, the film edge slit by the all-purpose razor blade (*Figure 1*) clearly shows a “postage stamp” effect. On the film edges slit by the standard industrial blade (*Figure 2*) and the tin-coated blade (*Figure 3*), there was gradually less friction between the film and the blade, and consequently, less film elongation, thus less “postage stamp” effect. The Fortisblade (*Figure 4*) resulted in a straight and clean cut. Additionally, note the decrease of the number of dust particles.

Generally, a roll of poorly slit film can easily be recognized by the high reel edges. There is a noticeable difference between the reel edge resulting from an all-purpose razor blade (*Figure 5*) and the straight reel edge coming from the Fortisblade (*Figure 6*).

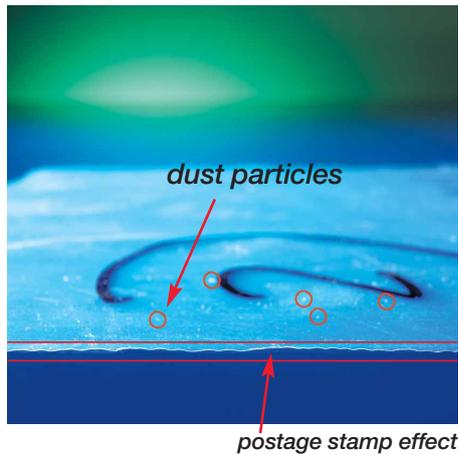
(*Figure 1*)
Slit by all-purpose razor blade



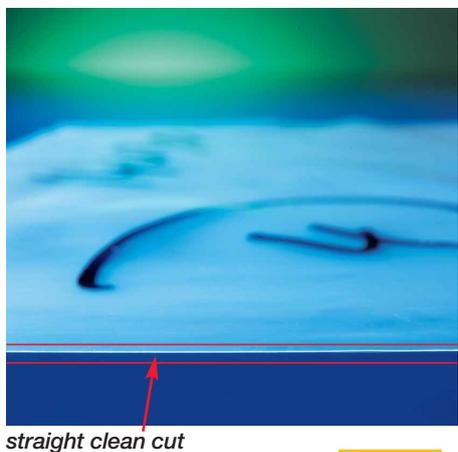
(*Figure 3*)
Slit by tin-coated industrial blade



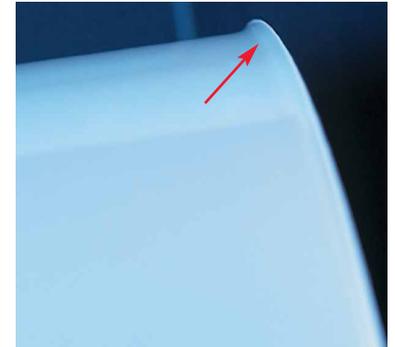
(*Figure 2*)
Slit by standard industrial blade



(*Figure 4*)
Slit by a Fortisblade



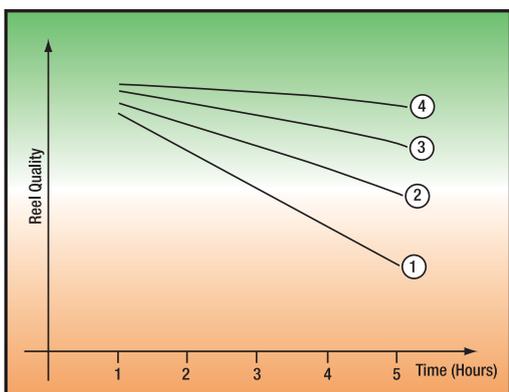
(*Figure 5*)
High reel edge



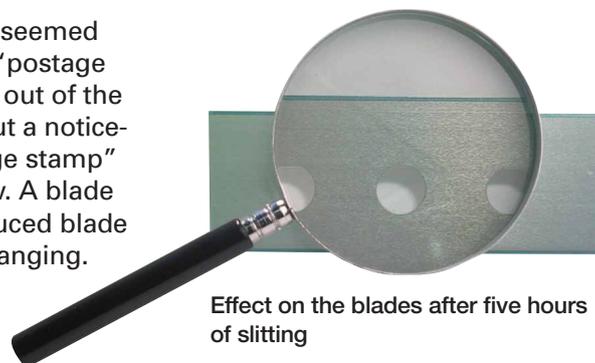
(*Figure 6*)
Straight reel edge



It was found that the performance of the various types of blades seemed to decline over time as the appearance of dust particles and the “postage stamp” effect increased during the hourly inspections. However, out of the four blades tested, the Fortisblade consistently cut the film without a noticeable increase in the appearance of dust particles and the “postage stamp” effect. These results are qualitatively depicted in the graph below. A blade that can cut consistently for longer periods of time results in reduced blade replacement, thereby reducing the risk of injury through blade changing.



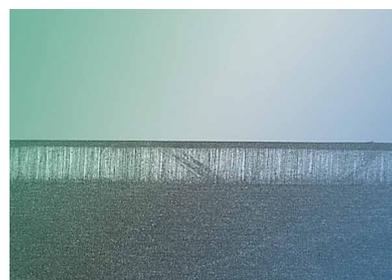
1. All-purpose razor blade
2. Standard industrial blade
3. Tin-coated industrial blade
4. Fortisblade



Effect on the blades after five hours of slitting



1. All-purpose razor blade is the most affected



2. Fortisblade is the least affected

Conclusion

If you are seeking improved film-reel edges and dust elimination, then improved film-slitting performance can be your solution. The results of this test display that slitting performance is greatly influenced by the type of blade that is chosen. When choosing a blade, keep the following benefits in mind:

- Safety with increased blade life – A longer blade life may result in a lower replacement frequency; changing a blade is always a risk.
- Blades that cut evenly result in straight reel edges that lead to:
 - Smooth winding and unwinding
 - Fewer wrinkles
 - Improved laminating and printing quality.
- Increased slitting performance results in dust elimination thereby providing:
 - Film solutions for clean-room applications
 - Improved print and laminating quality
 - Reduced maintenance through less dust removal.

For more information on blade selection and Fortisblade, please visit www.fortisblades.com or contact Mr. Callier at tec@eddy-callier.com (French or Italian requests) or Mr. Notteboom at tec@fortisblades.be (Dutch, English, German requests).

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