

# Pick Friction Pad Testing

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## Background

The purpose of this experiment was to assess the success of different friction pads at preventing separation events while not causing no picks. Then, find the average coefficient of friction (COF) for each of the friction pads and determine which friction pad would be most beneficial to HP.

- In a separation event, the copier would send more than one sheet of media to the separation tires. Separation events can lead to multi-picks.
- In a no pick, the copier would not pick up a sheet of media while picking, leaving it in the input tray.
- Without a friction pad, the last few sheets of media will likely be picked together causing a separation event.
- Four different friction pads, A, B, C, and D, were tested.
- Four different medias, Matte Brochure, Plain, Photo, and Glossy, were used to illustrate how the friction pads would react to different types of media material.
- In parallel with testing the performance of the friction pads in the copier, the coefficient of friction (COF) of each friction pad was measured.

## Separation Event/No Pick Procedure

For the Matte Brochure and Plain medias:

1. Load five sheets of media into the tray
2. Run 5 single sheet copy jobs
3. Record the number of separation events and the number of no picks in the data table and repeat for three trials

For the Photo and Glossy medias:

1. Load two sheets of media into the tray
2. Run 2 single sheet copy jobs
3. Record the number of separation events and the number of no picks in the data table and repeat for three trials

## Coefficient of Friction Procedure

1. Place paper sheet on the Standard Sheet Friction Tester (ASTM D 1894).
2. Place Friction Pad on the cart and place the cart on the rails.
3. Press Start to begin the trial.
4. Record the average coefficient of friction (COF) and hit return to return the machine to its starting position.
5. Repeat for a total of three trials of each type of friction pad.

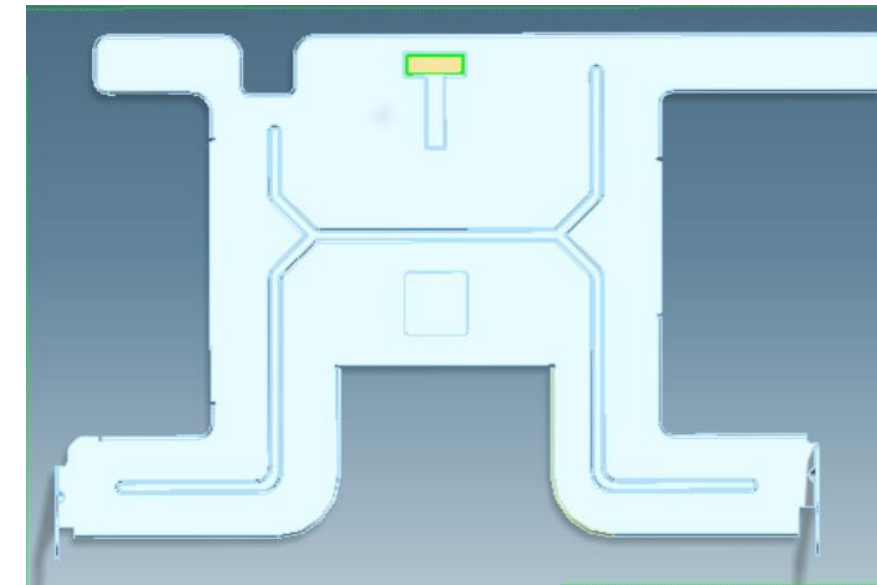
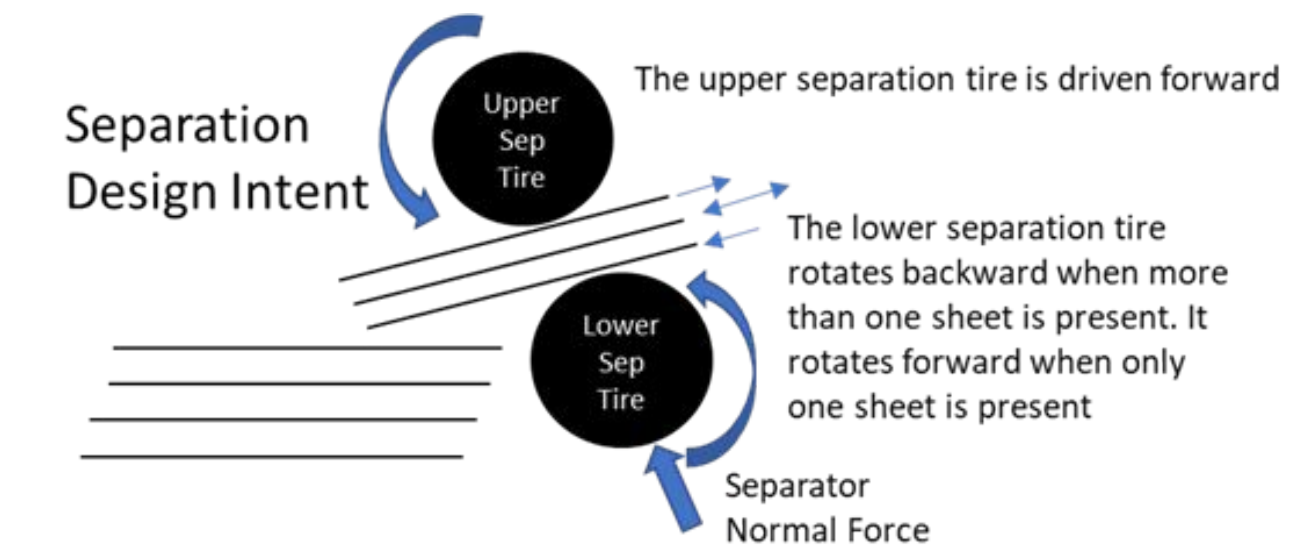


Figure 1. (left) CAD image of a lift plate featuring a friction pad



## Results

As seen in Table 1, almost all of the friction pad trials were successful during the separation event/no pick test. The COF testing displayed that the average COFs were fairly consistent with a low standard deviation. After determining which friction pad was most cost efficient, twelve more of the same friction pad had their COF tested. The COFs were lower, but passed a second round of separation event/no pick testing without any separation events or no picks.

## Discussion

Throughout this experiment, there were limitations that could have altered the results. In the coefficient of friction testing, there was only one sample of friction pad B used for testing, whereas three of each of the other friction pads were used for testing. The low sample size of friction pad B made the data less reliable because it was an unbalanced test. The standard deviation of the B friction pad was 0.0 because there was only one pad used. However, the other data were fairly consistent. The standard deviation of the samples of friction pad A was 0.03. The standard deviation of the samples of friction pad C was 0.034. The standard deviation of the samples of friction pad D was 0.029.

## Challenges and Successes

- One of my greatest challenges was removing a lift plate (see Figure 1) to change friction pads.
- One success was that multiple of the friction pads did not have separation events or no picks.
- Building upon that success, one of the friction pads that was successful was cheaper than the pad currently used in copiers. After further testing, it was determined that the successful pad could replace the current friction pads to save money.

## Future Research

If granted the opportunity to return and continue my research, I would like to test the impact of climate on the performance of friction pad A to simulate conditions to which the friction pads could be exposed.

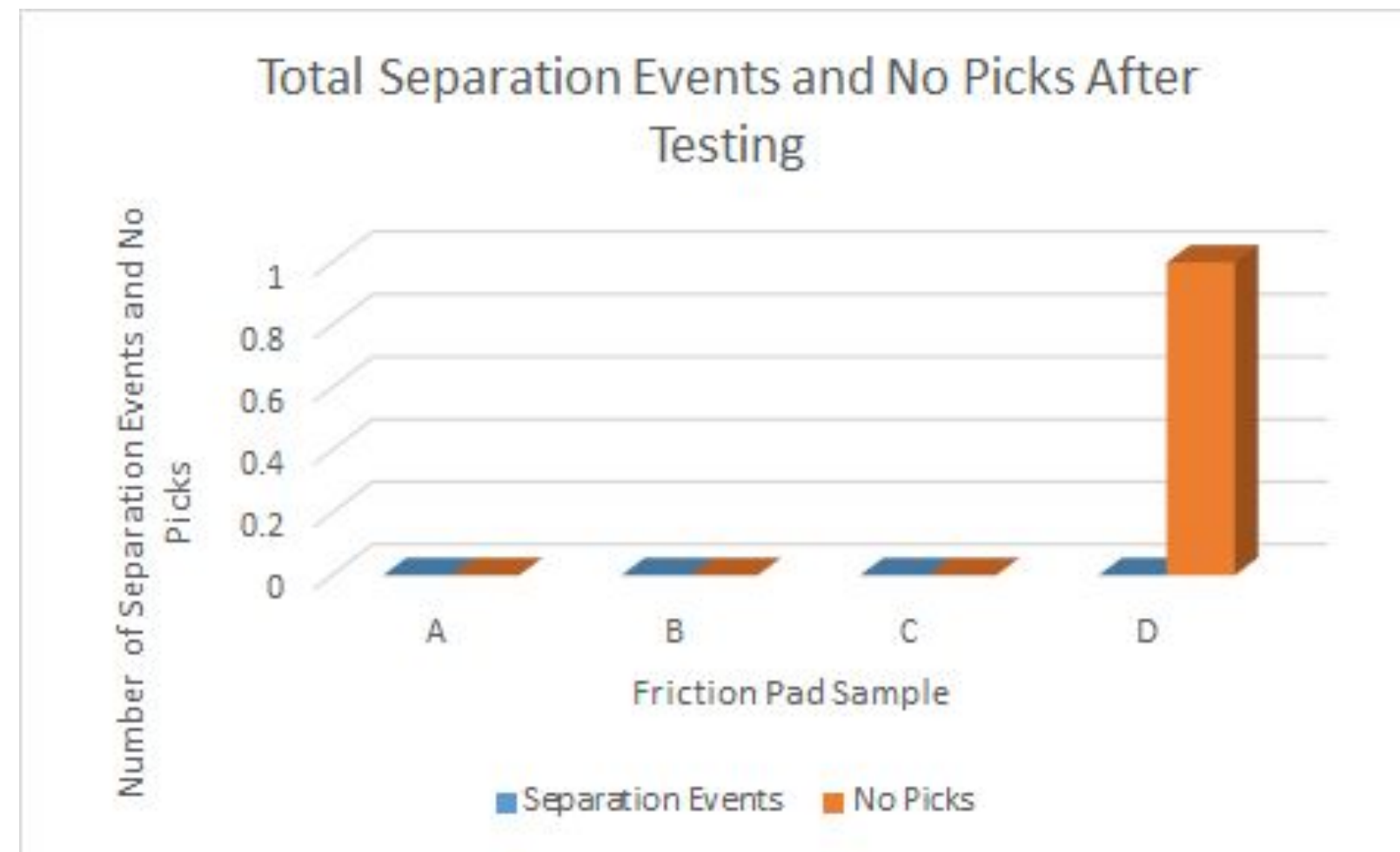


Figure 2. (above) This graph displays the results of the separation event/no pick testing. All of the friction pad trials were successful except for the first friction pad D trial with Photo media, during which there was one no pick causing the paper to jam.

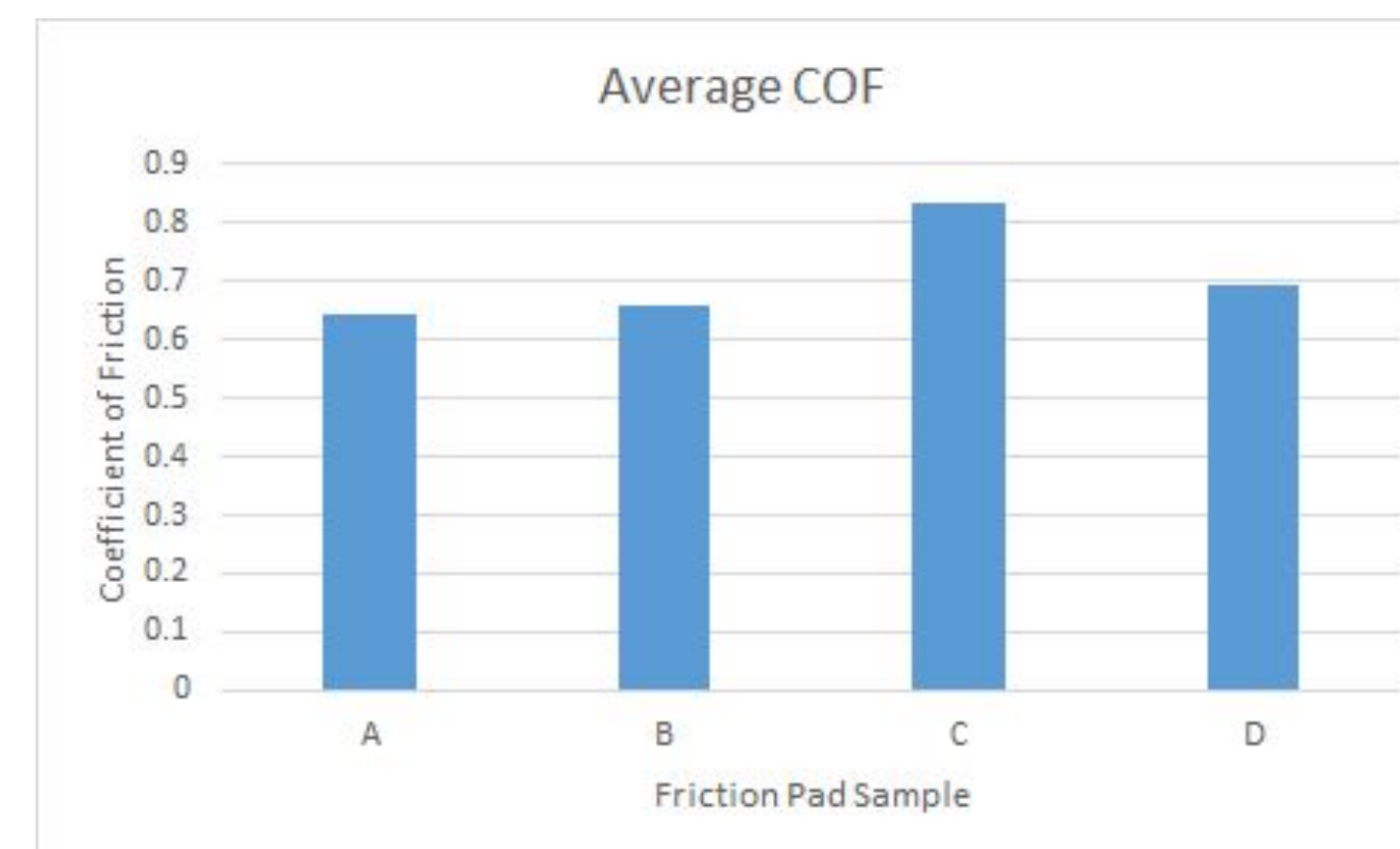


Figure 3. (above) A visual representation of the average COF (coefficient of friction) of each type of friction pad.