Direct Inject™ vs. Traditional Linen Packaging

Introduction

Direct Inject™ packaging is a novel technique designed to decrease prep and load time for new linens for initial wash.[1] The current process requires operators to open outer packaging, remove products from any inner polybags, remove any folds in the product (shake out step, for larger products) and hand load product into staging. The Direct Inject™ packaging technique utilizes unique folding methods combined with water soluble bags to reduce the required steps by operators to stage products for wash.[1]

Direct Inject™ provides key advantages to traditional linen packaging methods. Removing inner polybags minimizes the number of steps required to open and prep products.[1] The unique folding methods eliminate the need to remove folds in the product before washing (shake out step). The water-soluble bag is injected into the wash cycle and dissolved in the initial rinse, helping reduce the waste created and managed as part of the preparation process.[1]

Objective

The purpose of this study was to evaluate and compare the time savings between traditional and Direct Inject™ packaging for bath blankets, bath towels, flat sheets, pillowcases, and wash cloths.

Methods

Five product types (wash cloths, bath towels, flat sheets, pillowcases and bath blankets) were obtained in both traditional and Direct Inject™ packaging formats for a total of 10 SKUs (see Table 1). A total of eight individuals (n=8) participated in this study and were responsible for the preparation and loading of products for staging. The time it took to load the products into the laundry cart (i.e. loading time) and loading time after the initial packaging cutting were recorded. The time difference between traditional and Direct Inject™ packaging formats was analyzed and interpreted at a per-case level. Power analysis had recommended that a sample size of 16 (n=8 traditional laundry cases and n=8 direct inject laundry cases) be used to detect a significant difference in total time for laundry loads to achieve a minimum of 80% power. All analyses were conducted with 95% confidence in R® software, Version 4.3.1 or higher of the R System for Windows (Copyright © 2023 The R Foundation for Statistical Computing) and RStudio software®, Version 2023.3.2 or higher of the RStudio System for Windows (Copyright © Posit team (2023), RStudio: Integrated Development Environment). A Welch's Two Sample t-test (both normal, p-value >0.05) or a Wilcoxon rank sum exact test (non-normal, p-value <0.05) was performed for a distribution at the 95% level of significance.[1]

Table 1: Product Descriptions

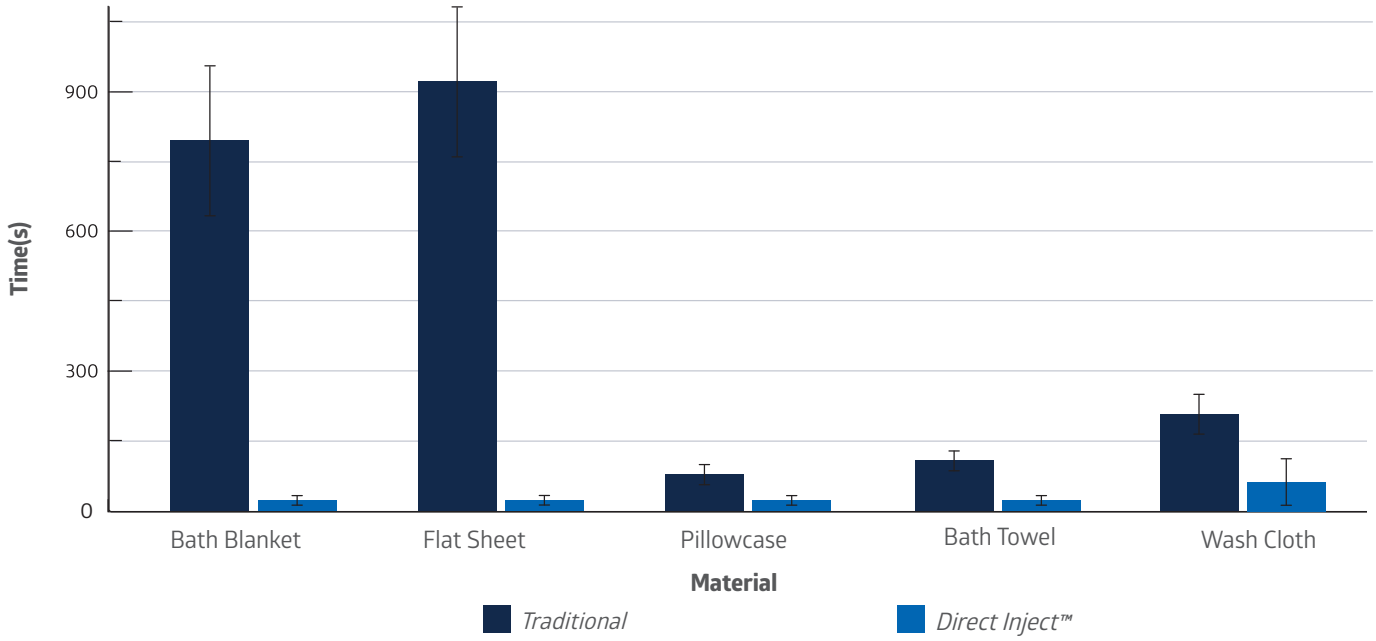
Product	Packaging	SKU	Lot Number	Qty/Case	Qty/Bag	Bag/Case	Total Case	Total Qty (ea)
Bath Blanket	Traditional	MDTBB3B17R	71924010001	48	6	8	21	1008
	Direct Inject™	MTBB3B17	37424C	25	25	1	40	1000
Flat Sheet	Traditional	MDTFS6S08	7412311001	60	12	5	17	1020
	Direct Inject™	MTFS6S08	NA	35	35	1	30	1050
Pillowcase	Traditional	MDTPC6S34	74124010001; 74124030002	144	12	12	10	1440
	Direct Inject™	MTPC6S34	NA	175	175	1	8	1400
Bath Towel	Traditional	MDTBT4B80R	39524B	120	12	10	10	1200
	Direct Inject™	MTBT4B80	312240	50	25	2	20	1000
Wash Cloth	Traditional	MDTWC4B16HPR	NN233	1200	60	20	8	9600
	Direct Inject™	MTWCH4B16	31224A	600	300	2	8	4800

**Note: Total quantities of product (eaches) between traditional and Direct Inject™ packaging were different from each other. Packaging specifications are subject to change, results in the study are based on product evaluated in August 2024.*

Results

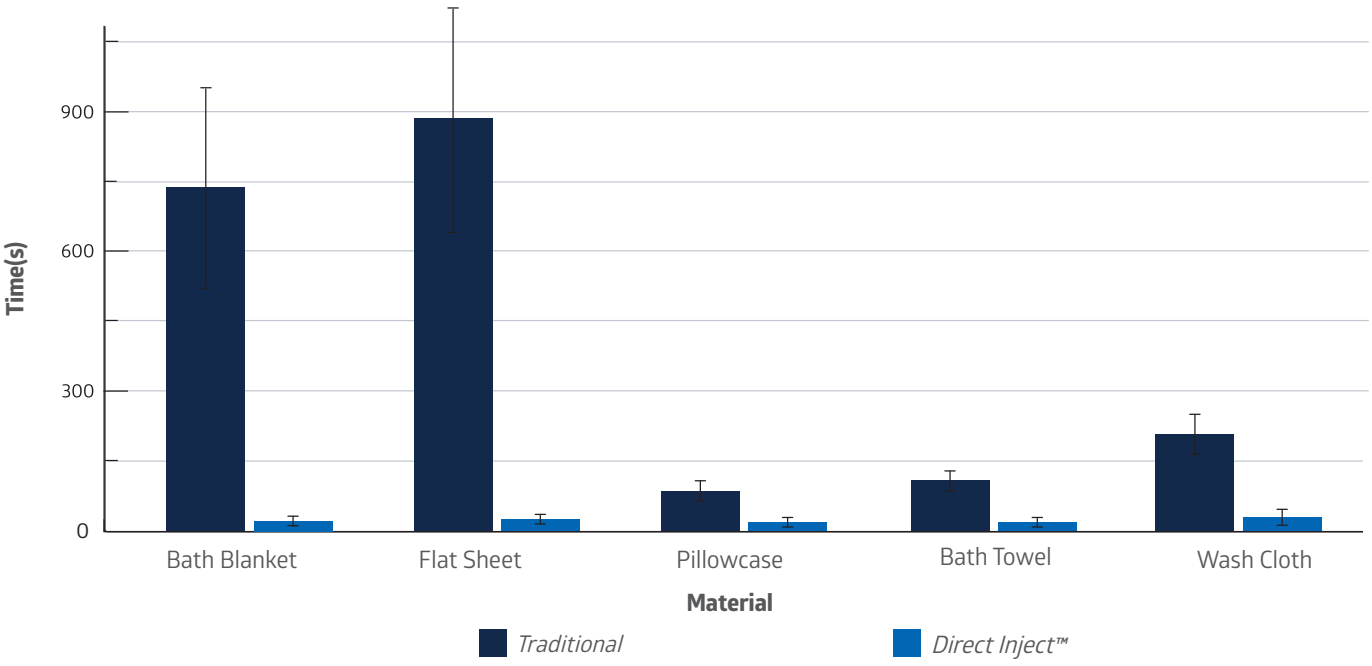
Time loading: The data analyses and **Figure 1** show the different loading times for five different products (traditional vs. Direct Inject™).[1] The loading time (**Figure 1**) decreased for all Direct Inject™ laundry packaging products (bath blanket (per case), -97.85%; flat sheet (per case), -97.94%; pillowcase (per case), -82.42%; bath towel (per case), -85.59%; and wash cloth (per case), -70.05%; when compared to the traditional laundry packaging. Overall, all Direct Inject™ products (bath blanket, flat sheet, pillowcase, bath towel, and wash cloth) showed a statistically lower (p-value <0.05) time loading than the traditional products.[1]

Figure 1: Time Loading Traditional vs. Direct Inject™ Packaging



Time loading after cutting: The data analyses and **Figure 2** show the different time loading after cutting results for five different products (traditional vs. Direct Inject™).[1] The loading time after cutting decreased for all the Direct Inject™ products (bath blanket (per case), -97.71%; flat sheet (per case), -97.40%; pillowcase (per case), -80.61%; bath towel (per case), -85.84%; and wash cloth (per case), -88.46%; when compared to the traditional products. Overall, all Direct Inject™ products (bath blanket, flat sheet, pillowcase, bath towel, and wash cloth) showed a statistically lower (p-value <0.05) time loading after cutting than the traditional products.[1]

Figure 2: Time Loading After Cutting Traditional vs. Direct Inject™ Packaging



Conclusion

Direct Inject™ packaging is designed to decrease prep and load time for new linens for initial wash. This may have positive implications for both workflow and efficiency. When assessing the loading time, the results showed a statistically significant decrease in favor of the Direct Inject™ packaging for all products (bath blanket = 12 minutes and 53 seconds, -97.85%; flat sheet = 15 minutes and 3 seconds, -97.94%; pillowcase = 1 minute and 15 seconds, -82.42%; bath towel = 1 minute and 35 seconds, -85.59%; and wash cloth = 2 minutes and 25 seconds, -70.05%). Furthermore, the loading time after cutting also showed a statistically significant difference in favor of the Direct Inject™ packaging for all products (bath blanket = 12 minutes and 4 seconds, -97.71%; flat sheet = 14 minutes and 22 seconds, -97.40%; pillowcase = 1 minute and 19 seconds, -80.61%; bath towel = 1 minute and 37 seconds, -85.84%; and wash cloth = 3 minutes and 4 seconds, -88.46%). Taken together, these results amount to anywhere from 70% to 98% savings in time, which may positively impact cost-savings. Moreover, the results suggest that Direct Inject™ packaging (when compared to the traditional packaging modality) is superior.

References

1. Data on file (Qual-126023)