White Paper

Hospitality Textile Life, Loss and Replacement
FOREWORD

TRSA Executive Roundtables from 2012 to 2015 have resulted in the pursuit of industry-wide solutions to protect launderers’ and their customers’ inventory investment by curtailing linen losses. The Roundtables agreed that theft or deliberate or inadvertent abuse of textile products are the major causes of their premature removal from service, raising costs.

Hotels can lose up to 15 to 20 percent of their linen inventory due to premature loss or discarding. At $250 per room for four par of basic sheets and towels, the industry invests $1.25 billion per year. Add duvet covers, pillow shams and bathrobes, the figure reaches $360 per room and $1.75 billion industry-wide. The loss factor can add $50 to $70 a room, raising the expense by $250 million to $350 million.1

Participants in the Roundtables directed TRSA to mitigate roadblocks related to optimizing textile inventory investment by:

• Educating customers about how the industry measures and maximizes linen life
• Enhancing information-sharing among launderers on best practices for such maximizing

This white paper achieves both. Compiled from various TRSA research projects in recent years and other industry sources addressing the issue as it relates to hospitality (hotel/lodging) customers, portrayed here are data and practices including:

• Leading causes of premature removal of textile inventory from service
• How launderers measure such loss
• Impacts of losses on costs

BEST PRACTICES TO MANAGE TEXTILE ASSETS

With merchandise expenditures making up a large amount of commercial laundries’ and on-premises laundries’ (OPLs’) total annual expenditures, hotel launderers have a huge incentive to closely manage inventory and pinpoint textile loss and abuse. TRSA has supported these efforts by facilitating calculation of industry averages for servings of textile products, enabling laundries to benchmark with the norm in their markets.

Such comparison helps textile services forecast inventory costs, budget their annual textile merchandise needs, schedule insertions, and determine which textile items have reduced life so they can concentrate management efforts on these goods and educate users to prevent abuse. Adjusting for loss/abuse and insertions (due to growth) helps refine expected servings for each textile item and provides a more accurate picture of what’s taking place with total merchandise inventory and cost.

Laundries that process hotel linens consistently and accurately tabulate their insertions and servings by item to unveil developing problems with a product type, which allows management to quickly respond. Data on losses continues to improve as companies’ databases grow and their results become more consistent over time.

Collecting and managing loss data has become fundamental to textile asset management. The following section details the language of textile inventory management and common practices required.

Key Metrics

Laundries keep close tabs on the following statistics as important indicators of merchandise consumption:

1. **Pounds—Total Clean Pounds of Laundry Delivered.** Proper accounting of the total usable pounds of laundry delivered is critical to determining measurable cost and comparing alternatives.

2. **Cost Per Pound.** The sum of relevant expenses of processing laundry divided by the number of pounds processed. This stat is used to identify fluctuations in overall plant efficiency when calculated for all products laundered. When calculated by individual textile product type, it aids budgeting for ongoing replacement of this product. Outsourced laundries include product purchase and replacement as relevant expenses to calculate cost per pound as rental pricing.

3. **Rewash/Rejects—Percentage of Work Rejected in the Laundry Process.** Controlling the amount of product rejected for quality in the laundry process and managing reclamation of the same is an important element of textile asset management. This typically falls in the 5% range.

4. **Ragout—Percentage of Product Removed from Service.** When an item is rejected after it is rewashed or otherwise deemed unworthy of remaining in service, it is removed as “ragout.” It may have completed its normal useful life (survived anticipated number of servings). If not, its premature demise is often attributed to one or more of the following:
   - Misuse by end users
   - Trouble with laundry chemistry such as incorrect formulas
   - Faulty production equipment or textile manufacturing (defects/poor quality)
   - Wrong textile product for the job (incorrect specification)

5. **Replacement Cost—Total Cost Per Pound of Textile Purchases.** Tracking the cost of textiles based on consumption (pounds) provides the ability to measure the textile’s life cycle cost most effectively. Loss and abuse charge provisions included in contract terms between the hotel and launderer may allow the laundry service rep to assess additional charges to cover the laundry’s replacement cost. Also called “linen utilization” fee.

6. **Par Levels—Textile Inventory in Circulation.** Maintaining sufficient in-circulating inventory of textiles ensures efficient laundry operations and housekeeping services. Levels are set based on occupancy, total inventory and pounds processed. Expanded par levels are associated with longer textile life and lower inventory replacement costs.
Techniques

Use of calibrated scales for receiving and shipping laundry is critical to accurately account for inventory. Other techniques used by textile services to this end:

**Distinguishing between actual and artificial loss.**

This improves linen economies by developing strategies for addressing recoverable versus non-recoverable losses. Actual loss refers to intended or unintended theft, abuse and discarding.

Artificial loss refers to inaccessible but retrievable inventory; goods are overstocked at the point they are about to be put into service. This wastes storage space and increases vulnerability to theft.

It also indicates a lack of understanding of the amount of linen required to serve the hotel, e.g., unsophisticated inventory management. This sharply contrasts with a just-in-time approach used where compliance with storage limits is essential. Exact physical inventories are required.

Such inventories guide purchases and control loss. The difference between an initial and subsequent counts, factoring in discards (ragout) and injections, is the unexplained loss, both actual and artificial.²

See Appendix B for a sample quantification of ragout versus loss/theft.

When actual losses are consistently identified, you have a clearer picture of how quickly linens wear out, where loss occurs and how to budget for replacements. A sensible replenishment minimum can be developed.

**Soil-to-clean factor.** This is a method for assessing soil returns for completeness: weigh them and apply a soil-to-clean factor to accurately compare the returned volume with the previously delivered volume. Typically, soil adds 10% to 12% weight to hospitality linen: lower when a property uses only bed/bath products, higher with F&B, swimming pools, spas and more.

This method is valuable for gauging linen loss whether it’s used weekly, monthly or quarterly. Soil to clean validates the daily transaction between the hotel and laundry and is a more cost effective way of counting. It is particularly helpful in educating hoteliers regarding costs associated with textile product loss.³

**Automated identification.** Radio frequency (RF) ID and barcoding are effective alternatives for many applications including uniforms and linens. Uniquely serializing (tagging with an RF chip or labeling with a bar code) items can provide insight into usage, loss, required par levels, inventory, turnover, hoarding and more.

Investment in RFID is often viewed as expensive up front but economical in the long run. Tags are reported to withstand 300 washings. The investment can produce a favorable return much sooner, such as in the case of a large resort with a pool towel pilferage problem. RFID was credited with reducing the number of thefts from 4000 to 750 per month, saving $16,000.⁴

RFID specifically provides for complete counting of tagged inventory with little to no additional labor. Placing the tag properly (finding the right spot) on a textile product and specifying tags that produce the proper RF signal are keys to capacity and effectiveness. Then diligence is needed to avoid commingling of chipped and non-chipped items. When both are contained in a bag, for example, which is scanned to determine its contents, the antenna finds only the chipped items, possibly creating the misconception the non-chipped items are missing.

**New textile testing.** It assures textile products’ reasonable durability for laundering. Testing hotel linens predicts whether they will process efficiently as well as withstand the laundry environment.

**Used wash test pieces.** These enable monitoring of tensile strength loss when products are in service.

Communication between laundry operators and hotels regarding techniques adds value to service. Suppliers who explain their internal practices and measures prove

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their concern for customers’ economic constraints and express interest in helping them drive policy and process changes. In lending expertise to hotels in managing and minimizing linen costs, launderers create a positive working environment with their hospitality customers. They educate rather than just charge for lost goods with no explanation.

FACTORS THAT IMPACT TEXTILE LIFE CYCLE AND COST

Linen Quality

Purchasing new textiles has become more complex. More products are touted as innovative, high-performance, high-quality fabrics at the same time that sources from across the globe are offering seemingly value-priced options. Whether a hotel aims to provide upscale or standard bedding, a printed copy of the manufacturer’s laundering and processing recommendations should be obtained with a longevity projection. Then it’s a matter of ensuring your launderer implements the correct processing routines. Adhering to the manufacturer’s recommendations should be enough for mid- to higher-quality imported or domestic textiles to remain in usable condition as long as anticipated, providing the expected return on investment.

However, such projections are not as reliable for newer products without many users’ track records to verify manufacturers’ longevity claims. The potential negative impact is magnified when you buy large quantities. In such cases, distributors should point you to some customers who have purchased the same goods so you can assess performance. Also you should receive a healthy quantity of sample products first for your test-washing and finishing.

On the whole, developments in fibers and fabrics are contributing to longer linen life. High thread-count Egyptian cotton has long been the standard for luxurious linens in hotels, but cotton does not make a particularly resilient textile. Every time it is washed, it sheds fibers from the yarn and yellows.

Thankfully, durable synthetics are losing their chintzy stigma. Textile manufacturers have developed cotton-polyester blends that look and feel like expensive fabrics, even to seasoned hoteliers. Skeptical hotels should explore these fabrics before writing them off.

Working with an outsourced textile service provides hotels with a partner in this matter and enables them to avoid the related investment risk by renting linens from the laundry. Textile services providers can procure linens in a variety of fabrics and levels of quality and are large purchasers, enabling them to receive volume discounts.

Intentional Theft and Abuse

Textiles are at risk of theft while in use. In addition to outright theft of product from unsecured areas, linen may be removed from service as rags to be illicitly resold or removed as trash and reclaimed downstream as part of an organized theft.

More common: misuse and theft by guests acting alone. Too many consider hotel towels to be disposable, using them to remove makeup or shine shoes. Certain types of sunscreens can permanently stain towels. Or they take towels with them. What is not thrown away ends up stained and damaged. Guests, as a source of loss, are difficult to control, though locking linen closets helps halt habitual thieves.

Organized crime may soon play a greater role, however, if the U.K.’s experience is repeated elsewhere. In 2011, Textile Services Association (TSA) members reported that numerous hotels had their laundry rooms raided in the past year and in some cases, all stock was stolen. This prompted TSA and the Institute of Hospitality to conduct a campaign to encourage better inventory management and report suspected linen crime, through confidential notification to police if preferred.

5. Bodner, Philip L. Controlling Linen Loss Is Key to ‘Saving Par’
They also pointed out that linen should be stored on the ground floor of a hotel's main building in a room that's well-lit, dry, and warm—with a lock on the door. Their other tips:

- Rotate linen stock regularly to avoid damage from lighting and reduce wear and tear
- Work to an agreed schedule with outsourced laundries
- Check all deliveries and collections
- Never leave laundry carts unattended

**Housekeeping/Maintenance Abuse**

TSA also points out that every employee needs to be more conscientious about linen. Soiled textiles are used to wipe up spills. They become drop cloths. Housekeepers will use them for any cleaning job in a guest room; maintenance personnel will grab a towel off a cart to wipe up grease. Outside cleaning vendors for hotels disappear with towels after using them.

Even the normal course of business can prove damaging. Laundry chutes and chute doors abuse textile products in the following ways:

- Chutes and chute doors with unreppaired metal tears and fatigue cause mechanical damage to textiles.
- Typically, there’s no consideration given to provide access to laundry chutes from inspection and repair, often making repairs to damaged chutes very difficult and in some cases impossible.

- Chutes allowed to accumulate soiled textiles in some cases back up the chute to the highest floors of the building. When this happens, thousands of pounds of pressure are realized at the bottom of the chutes. When product is pulled from the chute under such conditions, it typically may result in tearing the textiles.

In addition, “disaster” occurs when wet textiles fall directly on cement floors, creating conditions that make it extremely difficult to remove the cement stains.

**Inadvertent Chemical Damage**

Many disinfectants, cleaners and medications contain alkalis, acids, bleaches or other chemicals that can damage fabric and cause it to deteriorate. Damage begins when these chemicals come in contact with textile products through improper handling practices, such as:

- Resting containers of cleaners and disinfectants on textiles.
- Accidentally spilling cleaning solutions on textiles, or dropping them into cleaning solutions.
- Placing cleaning rags together with soiled textiles.
- Storing cleaning and disinfecting materials with textiles.

The following table lists several substances that can negatively impact textiles.

<table>
<thead>
<tr>
<th>Corrosives</th>
<th>Disinfectants and Antiseptics</th>
<th>Astringents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitric Acid</td>
<td>Bichloride of Mercury</td>
<td>Iron Chlorides (Ingredient of Throat Gargles)</td>
</tr>
<tr>
<td>Silver Nitrate</td>
<td>Hydrogen Peroxide</td>
<td>Zinc Sulphate (Ingredient of Certain Ointments)</td>
</tr>
<tr>
<td>Chromic Acid</td>
<td>Potassium Permanganate</td>
<td>Zinc Oxide (Ingredient of Certain Ointments)</td>
</tr>
<tr>
<td>Phenol (Carbolic Acid)</td>
<td>Silver Nitrate (Ingredient of Argyrols)</td>
<td>Alum (Chief Ingredient of Styptic Pencils)</td>
</tr>
<tr>
<td>Trichloracetic Acid</td>
<td>Cresol (Lysol)</td>
<td></td>
</tr>
<tr>
<td>Iodine</td>
<td>Hypochorites (Dakin's Solution and Zonite)</td>
<td>Zinc Chloride (Component of Certain Deodorants)</td>
</tr>
</tbody>
</table>
To prevent chemical damage to textiles, textile product users must recognize potential for damage from chemical compounds and take these precautions:

• Label all chemical substances.

• Store clean textiles in separate containers or areas, away from cleaning compounds.

• Store chemical substances in tightly closed containers and prevent or minimize the escape of fumes or powders during use.

• Keep wiping cloths in separate containers, away from textiles. Rags can be dyed a different color to prevent misuse; wipers sent to the laundry should be kept in separate bags.

**Observed End-User Inventory Practices**

Reducing par levels to a low level reduces the life cycle of textiles. The resulting consequence of lowering the inventory isn’t usually recognized for what it is, e.g. increased operational hours due to interruptions to cover shortages, increased housekeeping, labor, etc. Maintenance and utility costs rise as well. The “bottom line” shrinks.

Also, linens that are circulated at hotels with on-premise laundries may still be warm from processing when placed into service. Under these circumstances, cotton fibers are more vulnerable to damage. Even if cooled properly, because there isn’t enough linen, it’s washed more often, shortening its life, adding replacement cost.

Lack of circulating inventory stresses everyone involved in linen service. Shortcuts are bound to be taken that decrease quality. If a hotel outsources laundering of its own goods to a textile service and doesn’t have enough of them, more pickups and deliveries are required, increasing expenses. These higher costs include the additional effort needed to receive these additional deliveries.

Perhaps more important, insufficient inventory leads to decreased fill rates, a minus for customer confidence, threatening revenue.

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**POSITIVE IMPACT OF PROFESSIONAL LAUNDERING**

Malfunctioning equipment and abuse of chemicals are rare in professionally managed laundries. Textile services professionals recognize that abuse of chemistry, mechanical action and excessive temperature can surpass all other loss issues quickly, if allowed to go uncorrected. Thus, continuous monitoring of wash formulas to ensure textile quality is the industry norm.

Launderers also recognize the importance of machinery maintenance and repair to prolonging textile life, wary of how washing machine doors or any rough spots in a washer cylinder can snag and tear textiles. Transports and carts are kept free of protruding nails or sharp edges to reduce snagging. All washing and finishing machinery is kept clean, so that oil and grease stains don’t increase ragout counts.

Textiles exhibit some long-term effects of chemistry, mechanical action, drying and flatwork finishing during their lifetime.

Professionally managed laundry facilities interviewed for this report indicated the value of improving laundry processes to extend textile life. One central hospitality laundry calculated savings of up to 20% in textile replacement due to improved chemistry and formulations in the wash and other process improvements, citing:

• Alternative wash formulas

• Proper calibration
• Improved maintenance and operations of dryers
• Increased efforts to reclaim textiles that had been rejected for quality.

Steady improvements in wash formulas and the use of new chemical formulations continue to combat premature wear and tear of linens. The days of using only detergent, bleach and softener have given way to new formulations that do a better job of removing stains and extending linen life. Thanks in part to greener technology and chemistry, discard factors are down. There’s less overdrying. Newer machine technology and formulas are generally less aggressive, yielding as much as a 20 to 30 percent extension of linen life.7

Because laundry is their core business, outsourced launderers are more adept at using chemicals properly than laundries with less production. Consistent measurement and monitoring of chemistry is key to delivering the quality that hotels demand.

Preventing Tensile Strength Loss

Tensile strength is the ability of a fabric to resist tearing and breaking. All fabrics lose tensile strength over time, but excessive tensile strength loss (TSL) is costly. The higher the TSL, the less resistant the fabric is to tearing, and the shorter its useful life. This leads to frequent replacements and high costs.

Bleach can be the most damaging of all the chemicals that laundries use. For this reason, laundries control the release of bleach during the bleach bath to prevent high TSL. The pH level must not get too low and the temperature must not get too high, or the bleach will be released too quickly and start to attack the fabric. Using too strong a bleach or too much bleach will have the same effect. Residual bleach, if left on the fabric, leads to high TSL.

Another factor that leads to high TSL is excessive mechanical action—this causes fibers to be pulled from the yarn. Excessive mechanical action can be caused by underloading, protracted processing, too much time between filling and draining, and not using enough water.

Also, a combination of high alkaline builders and very high temperatures can lead to high TSL. Proper use of alkaline builders shouldn’t affect the tensile strength of linens.

Reducing hot water temperature without adjusting the washing procedure to the lower temperature can cause excessive TSL due to the nondecomposition of chlorine bleach.

Overdried cotton fabric can have less than half the strength as fabric that has been brought to room temperature and humidity.

Calculating Annual Replacement Costs

With so many factors potentially affecting textile replacement costs from year to year, hotel laundry operators are incentivized to be aware of them all and maintain consistent practices for processing and handling textiles. Annual replacement costs still can go up or down, but over time, the highs and lows average out.

For a hotel that does its own laundry, or seeks to better control outsourcing costs, simply recognizing that linen loss must be quantified is the first critical step in improving management of circulating linen inventory. This begets ascertaining:

- Where loss is prone to occur
- Developing policies and programs to prevent unnecessary depletion
- Calculating annual replacement cost

The big picture must be assessed, examining how linen is:

- Processed
- Distributed
- Utilized
- Returned
- Monitored

7. Kertanian, Harry. What’s In Your Linen Closet?
This leads to implementing quality control programs that forecast planned losses, such as discards and rags-outs. Planned depletion and replenishment are keys to maintaining a viable circulating linen inventory. This philosophy led one New York hotel to budget annual rooms linen replacement cost at $2.50 per occupied room and annual food-and-beverage linen replacement cost at 20 cents per cover.8

CONCLUSIONS AND RECOMMENDATIONS

Large laundry operations have the expertise to maintain and operate equipment efficiently with a focus on producing higher quality textiles. Generally, those processing a larger volume of goods are more likely to take advantage of opportunities to drive consistency of product and quality and thereby achieve the greatest return from their textile assets.

These opportunities include textile testing and inspection, which reveal the advantages of certain products (those likely to last substantially longer than others) based on the raw materials used and construction of the fabric. Testing of new products assures reasonable durability for the intended purpose and to help identify the potential benefits of alternative products.

Maintaining adequate inventory of textiles in circulation and taking steps to secure product and reduce abuse and theft contribute significantly to the most efficient laundry supply chain. Loss and abuse of textiles are a significant cost that should be included in the budget, since these costs may not be controllable.

Hotel laundry operators, textile manufacturers and chemical suppliers working together have demonstrated the ability to extend textile life and thereby reduce life cycle cost. The controllable factors that affect textile life cycle cost include:

1. Quality of the raw materials
2. Quality of the textile construction
3. Chemical formulation
4. Equipment maintenance and processing practices, and reliability of equipment
5. Quality of measurements of key performance indicators
6. Adequate textile inventory
7. Textile security
8. In-service staff should discard nothing—only the laundry should remove product from service

With proper focus on the factors mentioned above, methods can be developed to extend textile life, lower operating costs and thereby boosting the profit margins of hotels and their launderers.

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8. Loelius. Controlling Linen Loss Is Key to ‘Saving Par’
APPENDIX A — HOTEL TEXTILE SERVINGS SURVEY

TRSA 2012 HOTEL CHAIN ANALYSIS

In 2012, TRSA hired an independent research firm that surveyed 36 hotels representing a total of 20,381 rooms and 6,083,090 annual room nights. The facilities represented a cross-section of the hospitality industry. Characteristics of these facilities include:

- 91% of the reporting hotels indicated tracking production by clean weight and 9% tracked soiled pounds.
- 16% of the total rooms were luxury and the balance full-service hotels.
- 57% of respondents had a spa.
- 82% of respondents had banquet facilities.
- 33% of respondents had water theme facilities.
- 14% of the respondents had laundry provided by an on-premise laundry.
- 25% of the respondents received laundry from a commercial laundry supplier.
- 61% of the respondents received laundry from a central laundry facility.

Based on our survey of the hotel laundry facilities mentioned above, the following table sheds light on the average number of servings of common items in a hospitality laundry. These numbers may vary widely based on textile quality and process control.

Table 1—Hospitality Textile Servings

<table>
<thead>
<tr>
<th>Item</th>
<th>Servings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bath Towels</td>
<td>51.51</td>
</tr>
<tr>
<td>Hand Towels</td>
<td>27.04</td>
</tr>
<tr>
<td>Washcloths</td>
<td>17.31</td>
</tr>
<tr>
<td>Bath Mats</td>
<td>30.45</td>
</tr>
<tr>
<td>Pillowcases</td>
<td>49.11</td>
</tr>
<tr>
<td>Fitted Sheets—Full</td>
<td>71.93</td>
</tr>
<tr>
<td>Full Sheets</td>
<td>81.57</td>
</tr>
<tr>
<td>Fitted Sheets—King</td>
<td>44.72</td>
</tr>
<tr>
<td>King Sheets</td>
<td>79.69</td>
</tr>
<tr>
<td>Blankets</td>
<td>44.00</td>
</tr>
</tbody>
</table>
PHILLIPS & ASSOCIATES REPLACEMENT FACTORS

Since 1989, Minneapolis-based Phillips & Associates has published replacement factors as rules of thumb for determining the life of textile products and their costs. Shown here from the company are composite averages for hospitality-related projects the firm conducted over that approximately 20-year span. Phillips updates the data every two to three years.

**Column A – Products:** Phillips & Associates recently reported on eight bed linen products and three F&B products. For each, various combinations of *fabrics*, white/colored or size/weight may have been evaluated—*variations* of the product.

**Column B – Fabrics:** Types found in products evaluated.

**Column C – Variations:** Combinations of fabric, white/colored and size/weight evaluated in each product classification. Regardless of any such combination, every variation of each product had the same gross replacement factor and uses per item.

**Column D – Gross Replacement Factor:** Number of new items placed into service in a given period of time divided by the total number of pieces used during the same period.

**Column E – Uses Per Item:** 1 divided by gross replacement factor

<table>
<thead>
<tr>
<th>A Product</th>
<th>B Fabrics</th>
<th>C Variations</th>
<th>D Gross Replacement Factor (%)</th>
<th>E Uses Per Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bed And Bath</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Blanket</td>
<td>100% poly, Acrylic Saturna, Vellux</td>
<td>14</td>
<td>2.77</td>
<td>36.1</td>
</tr>
<tr>
<td>2. Mat, Bath</td>
<td>100% cotton</td>
<td>3</td>
<td>2.6</td>
<td>38.5</td>
</tr>
<tr>
<td>3. Pads, Mattress</td>
<td>100% poly</td>
<td>4</td>
<td>3.8</td>
<td>26.3</td>
</tr>
<tr>
<td>4. Pillowcase</td>
<td>50/50, percale, muslin</td>
<td>7</td>
<td>2.5</td>
<td>40</td>
</tr>
<tr>
<td>5. Sheet, Flat</td>
<td>100% cotton, 50/50, muslin, percale</td>
<td>22</td>
<td>1.7</td>
<td>58.8</td>
</tr>
<tr>
<td>6. Towels, Bath</td>
<td>100% cotton</td>
<td>8</td>
<td>4.61</td>
<td>21.7</td>
</tr>
<tr>
<td>7. Towel, Hand</td>
<td>100% cotton</td>
<td>3</td>
<td>6.58</td>
<td>15.2</td>
</tr>
<tr>
<td>8. Wash Cloth</td>
<td>100% cotton</td>
<td>4</td>
<td>9.09</td>
<td>11</td>
</tr>
<tr>
<td><strong>Food And Beverage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Napkin</td>
<td>50/50 Beauti damask, 50/50 no-iron Momie</td>
<td>6</td>
<td>3.5</td>
<td>28.6</td>
</tr>
<tr>
<td>Tablecloth 2</td>
<td>50/50 Beauti damask, 50/50 no-iron Momie</td>
<td>24</td>
<td>4.2</td>
<td>23.8</td>
</tr>
<tr>
<td>Banquet Cloth</td>
<td>Beauti damask</td>
<td>18</td>
<td>4.67</td>
<td>21.4</td>
</tr>
</tbody>
</table>
**APPENDIX B — RELATED RESEARCH**

**ANNUAL REPLACEMENT PERCENTAGES**

Although the numbers vary significantly based on the individual hotel, a survey of five full-service hotels indicated an average of approximately 29% of the textiles placed into service are replacing product that was incidentally lost or stolen. Approximately 70% replace product discarded by the hotel.

**LOSS/THEFT vs. DISCARDS**

This data from a luxury hotel details the amount of textiles removed from service by the laundry, by the hotel as part of their quality assurance (QA) efforts, and the unaccounted losses due to the loss and theft. While the percentage of product removed by the hotel and laundry vary as a result of the application of QA programs, the losses due to theft of product by guests are typically uncontrolled and are a significant component of the total cost.

**Textiles Removed from Service**

<table>
<thead>
<tr>
<th>Item</th>
<th>Removed by Laundry</th>
<th>Removed by Hotel</th>
<th>Lost in Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bath Towels</td>
<td>55%</td>
<td>37%</td>
<td>7%</td>
</tr>
<tr>
<td>Hand Towels</td>
<td>24%</td>
<td>56%</td>
<td>20%</td>
</tr>
<tr>
<td>Washcloths</td>
<td>2%</td>
<td>18%</td>
<td>79%</td>
</tr>
<tr>
<td>Bath Mats</td>
<td>81%</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>King Sheets</td>
<td>58%</td>
<td>14%</td>
<td>28%</td>
</tr>
<tr>
<td>Queen Sheets</td>
<td>60%</td>
<td>26%</td>
<td>15%</td>
</tr>
<tr>
<td>King Pillowcases</td>
<td>19%</td>
<td>41%</td>
<td>39%</td>
</tr>
<tr>
<td>Total</td>
<td>43%</td>
<td>29%</td>
<td>28%</td>
</tr>
</tbody>
</table>

**OTHER TRSA RESOURCES**

**National Online Survey of Consumers.** In this survey of 700 people about how linens, uniforms and other textile products affect their satisfaction as customers in various commercial settings, respondents commented on the importance of linens to their hotel stays. They were largely skeptical regarding linen conservation programs as environmental activism, indicating hotel management undertakes these primarily to control costs.

**Business to Business Survey of Uniform and Textile Rental Decision Makers.** Among 200 respondents who operate businesses with textile needs were hospitality business operators, including hoteliers. A majority of them opined that linen loss is a problem for their operations. Nearly one third indicated they had considered outsourcing their laundry work but couldn’t find a linen supplier to do the work.

More details on both surveys can be found at [www.trsa.org/research](http://www.trsa.org/research).

**TRSA in the News.** This webpage contains links to recent articles in business media written by TRSA or reporting on TRSA activities. Topics include sustainable laundry techniques, correctly calculating the full cost of laundry and best practices for reducing linen loss. [www.trsa.org/inthenews](http://www.trsa.org/inthenews)