Accurate Fabric Costs - Improving Fabric Yield Estimates

by Robert Broadhead

In this article I address the process of estimating fabric yields, the complications involved in offshore contracting, and how to be as accurate as possible in predicting/negotiating fabric costs.

Fabric is 25-40% of the cost of manufacturing a garment, so accuracy here is worthy of attention. (We've heard this a lot over the years, but it's worth repeating. No other single refinement in production can provide substantial cost savings as easily as fabric control.) Controlling or negotiating fabric costs has become more complicated as overseas manufacturing and cut-make-trim (CMT) / package programs have grown. Before work went offshore, in-house fabric yield estimates and final production consumption reflected cutting department work (either the manufacturers or a local contractors) that was readily known and monitored. However, it is surprising that many businesses do not track the variance between the actual cost of fabric at the end of production and the estimated cost of fabric on the bill of materials. This can significantly impact the bottom line.

CMT Programs

With CMT programs, contractors are essentially being paid for their labor while the Retailer or Manufacturer (R/M) supplies the fabric; therefore, tracking fabric yield often does not get the attention it warrants from the contractor. Cutting department procedures may vary in other countries and problems of time, distance, and culture may also affect results. However, the R/M still controls the patterning and yield estimating process and should have a good idea of expected usage. Regardless of who does the production markers it is important to reach an agreement in advance of production about how variances in consumption will be handled.

Package Programs

Package programs further complicate estimating and negotiating accurate fabric yields. Retailers and Manufacturers are asking Contractors to bid on package programs based on limited information (e.g., a spec sheet, sample garment, and, perhaps, a "block" pattern) with a short period of time to return a bid. Both parties understand that all the information needed to establish an accurate fabric yield is not available at the time of the price negotiation and everyone wants to avoid up charges and renegotiating costs after their final pricing and margins are set. Given this climate the Contractor is in a bind. They don't want to bid too low and lose profit margin but also don't want to bid too high and lose the business. The result is often a moderately high bid from the contractor to allow for changes in the final patterning and other unsettled aspects of final production. The R/M also has limited ways to evaluate the accuracy of the yield since they no longer create a finished pattern. An important question for the R/M is whether it is worth it to create a pattern and develop it sufficiently to provide an accurate estimate for negotiating fabric costs.

In an environment of faster turn times and less information to work with, we'll look at the possible ways to estimate fabric usage and the pros and cons of using each in Local / CMT / Package programs. But first, let's look at the main factors affecting final production consumption, which is what we want to estimate.

What Happens in the Cutting Department

Graded patterns are marked to produce the quantities ordered in each size. These markers reflect the final fit patterning, proper grading of sizes, fabric cuttable width, and the percentage of production being produced in each size. In spreading fabric, the marker sections are overlapped at the ends by a small amount and this also adds to fabric consumption. Fabric quality affects how much damaged material is going to be lost in the spreading process, so there is a 'damage cut out percentage' that can be quantified at the end of production. Other impacts on material utilization are allowances for fabric quality testing, bias, and re-cutting garment parts.

Fabric consumption at the end of production, then, is dependent on these components:
1. Final fit pattern
2. Pattern grade
3. Fabric cuttable width
4. Distribution of units in the size range
5. Marker section overlaps
6. Damages cut out in spreading
7. If applicable, fabric quality testing, bias, and re-cuts

**Estimating Production Yield**

Fabric yield estimates are an attempt to account for these components of material utilization. More detailed and accurate itemization of production processes in the estimate gives more accuracy. Less detail and more averaging leads to less reliable estimates (a common approach, for example, is making a sample size estimate marker and adding an average percentage to the yield to account for all the other components). Estimates are often done at three stages in the style development process.

A *design estimate* may be made early in the design phase to determine if the style can be produced profitably. This is the least accurate "ballpark" estimate because the final determination of patterning, fit, and fabric cuttable width and quality may still be in development.

Once a style has been adopted as part of a line a *fabric purchase estimate* is needed. Accuracy here is very important since 25-40% of the cost of manufacturing will be spent using this "yards per garment" number. Most of the components of production yield are nearly in their final form, so good estimate numbers are possible. That is, the pattern is close to final fit approval and the fabric source/cutable width/quality are available. The fabric quality, in the form of an inspection report from the mill, can be converted into an anticipated damage percentage that will be cut out in spreading (more on this later). While a significant percentage of sales numbers are still missing, if any at all are available, past season's sales percentages by size are available for a similar style and are a sound basis for yield estimate calculations.

The final estimated yield is made going into production in the form of a *cut plan*. The cut plan can be made for a single order or for the entire season's production on the style. Production markers are made to cut the quantities sold in each size. They reflect the verified cuttable width of the fabric. The historic or calculated damage cut out percentage is added to the marker yield, as is the historic or standardized marker section overlap allowance.

When final production units and yardage used are recorded, this actual yield is compared to the *design, fabric purchase*, and *cut plan estimates* to calculate the percent error at each stage. Tracking estimate error allows gain/loss calculations and the opportunity to identify improvements in the process.

Let's examine the methods available to estimate fabric yield and which are best applied to each type of program.

1. **Duplicate the production process.** I worked for a children's wear screen printing firm that sold only a few basic styles, in a fixed ratio, in a limited number of fabrics, year after year. Nearly all the components of production yield were known and only the screen printing varied. We made full sets of ratio production markers for *fabric purchase estimates* and were very accurate in our estimates of final production usage. Due to the simplicity of the patterns this was cost effective and could be done within our design and production time schedule. *Design estimates* were not needed as our production history provided the ballpark yields needed. Cut plans were made on an order by order basis but not for the season, since the *fabric purchase estimates* were very accurate. This was an unusual situation as most companies cannot afford the time or cost of fitting, grading, or production marking early in the production cycle.

2. **Use Graded patterns for estimate markers.** Graded patterns usually offer a more accurate way to estimate yield than using the sample size pattern. For example, look at an 8-18 size range with a sample size 10.

    | size  | 8  | 10 | 12 | 14 | 16 | 18 |
    |-------|----|----|----|----|----|----|
    | % of Production | 8% | 17% | 25% | 25% | 17% | 8% = 100% |
    | Sales Ratio | 1 | 2 | 3 | 3 | 2 | 1 |

Using a size 12-14 combination in the estimate marker has two advantages: 1) these sizes represent 50% of production, and 2) they fall in the middle of the size range and so they more accurately represent the yield of the 10-16 and 8-18 size combination production markers. To this "marker yard per garment" yield can be added allowances for damage,
overlap, etc. For Local and CMT programs, the improved accuracy of the *fabric purchase estimate* usually justifies the time and expense of grading. For Package programs, the main question is how much work is going to be done on patterning, if any, for the sake of evaluating bids and negotiating fabric costs. The simple answer on this is - patterning is worth it! More on this later.

3. **Use sample size patterns for estimate markers and averaging the other components of production.** This is one of the most common procedures but has serious limitations. In the above 8-18 example the sample size 10 represents only 17% of production and the marker layout does not represent the 12-14, 10-16, or 8-18 pattern arrangements. An average percentage can be added to the size 10 estimate marker to compensate for this discrepancy but there will be a significant error in this averaging from fabric to fabric and style to style, even within a body type. An additional source of error is that most sales numbers do not occur in a convenient 1-2-3-3-2-1 ratio, as in this example. For Local/CMT/Package programs, marking a sample size pattern and adding a lumped average percentage (representing grading, damages, etc.) at any stage of estimating yield leads to a high error rate that can be avoided.

4. **Estimate yield** using a similar style from a previous season that has a known production yield. Without a pattern, the accuracy of the estimate gets even more erratic. Small patterning differences can cause larger than expected yield variances. A review of 17 styles of women's 5-pocket jeans all marked at 61.5'' showed final production yields from 1.11 to 1.32 yards per garment - a 19% difference! Trying to mathematically convert the yield of a similar style marked at one width (e.g. 62'') to a new style at a different width (e.g. 54'') will skew the results further. With Package programs the R/M that chooses not to develop a patterned estimate is vulnerable to overcharges on fabric. A company recently approached me saying that by evaluating bids based on similar styles their average negotiated fabric cost was 15% high.

5. **Estmarktm software** is a new offering to the apparel industry that accurately estimates fabric yield by itemizing all the components of production into its calculation. The accuracy of the results depends on the quality of the data entered. If the seven components of final production consumption, listed above, are used with a sample size estimate marker the results can be accurate to within one percent of the actual final production consumption. If a "block" or non-final-fit pattern is used and averages are itemized for each of the other components the error can be held to under five percent, on the average. The *fabric purchase estimate* for Local/CMT/Package programs will fall within a 1-5% error depending on the accuracy of the data input. The software also includes a conversion program in which the damage cut out percentage is calculated by inputting a fabric inspection report; a useful tool since inspection reports are readily available from fabric mills and damage cut out percentages vary widely.

Using the infant's wear example below in the size range Small-5XL with a sample size Medium estimate marker, it becomes easier to see how this process is better than the others.

<table>
<thead>
<tr>
<th>Size</th>
<th>S</th>
<th>M</th>
<th>L</th>
<th>XL</th>
<th>2XL</th>
<th>3XL</th>
<th>4XL</th>
<th>5XL</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Production</td>
<td>6%</td>
<td>9%</td>
<td>18%</td>
<td>19%</td>
<td>16%</td>
<td>15%</td>
<td>11%</td>
<td>6%</td>
</tr>
<tr>
<td>Pattern Grade</td>
<td>9%</td>
<td>0%</td>
<td>8%</td>
<td>17%</td>
<td>26%</td>
<td>35%</td>
<td>42%</td>
<td>48%</td>
</tr>
</tbody>
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Using any simple combination of graded sizes, much less the sample size, in an estimate marker will not adequately represent the pattern grade or the distribution of production within the size range. With Estmarktm, each percentage of pattern grade and unit distribution within the size range is used in the calculation, so there is no averaging. The resulting estimated yield can only be improved on by making a full set of production markers.

Estmarktm is a tool for Retailers/Manufacturers/Import Brokers/Contractors to achieve a fact-based partnership. The calculated yield is as accurate as it can be using the best data available at the time. If any of the items in the calculation change (e.g., fabric width/quality or patterning), the itemized process provides the fact-based recalculation format for any yield adjustment.

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