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GARMENT COSTING PRIMER

Much has been written on the subject of Garment costing. This Primer
is an attempt to identify the common terminology which is associated
with Garment Costing, to summarize the process of developing Costing
Multipliers, and explain their use.

This primer will deal with the elements of garment costing in their
most individual fashion. It is understood that most manufacturers
either ignore some of the elements (due to lack of necessity,
insignificance, or ignorance) or combine some to make the process
easier to deal with. These costing methods reflect commonly accepted
practices in the apparel industry. Terminology is explained in the
following glossary.

THE MARK-UP FACTOR

.....A number, which when applied to the prime cost, will result
     in the appropriate wholesale selling price.

For most firms, initial development of the "Mark-Up Factor" (M.U.F.)
Costing multiplier is either a formal process, or a haphazard one,
depending on the background and expertise of the founders of the firm.
Regardless of how the original factor is developed, the continuous
reevaluation and modification of this factor to reflect the growing
and changing financial profile of the company, and it's environment,
is essential for accurate costing.

THE PRIME COST

.....The cost of all labor and materials required for the manufacture
     of the product.

After the Mark-Up Factor, the Prime Cost (P.C.) is the next most
important element in Garment Costing. The major components of Prime
Cost are Raw Materials and Direct Labor. Depending on the profile of
the manufacturer, these elements may be individually calculated, or
they may be supplied by a vendor.

THE WHOLESALE SELLING PRICE

.....The selling price at which merchandise is offered for sale
     to the retailer.

Development of an accurate Wholesale Selling Price (W.S.P.) is the
primary objective of the costing exercise. The Wholesale Selling
Price, (the purchase price that the Retailer pays for the product),
ultimately determines what the Retail Selling Price (and the price
point) will be. To establishing the Mark-Up Factor applied to the
Prime Cost of each style, a "Target" Wholesale Selling Price is used.
The "Target" W.S.P. is the median Wholesale Price point of the market
in which the Line or Style will sell.

The "Target" Wholesale Selling Price is obtained from research of the desired selling market. Once a viable Mark-Up Factor is established, this Factor is applied to the individual Prime Cost of each style to be costed, and the resultant Wholesale Selling Price may be used for the purpose of marketing that style.

OVERHEAD.....All indirect expenses incurred in the operation of a business. A portion of these expenses will be apportioned to the Wholesale Selling Price of each product (abbreviated OH.).

RETURN ON INVESTMENT OBJECTIVE
.....The amount of money the owners (or investors) would like to make on their investment in the business as Profit. A portion of this profit objective will be apportioned to the Wholesale Selling Price of the product. (R.O.I.O.)

INTRINSIC VALUE.....(should it exist), the amount of money added to the prime cost, overhead, and return on investment objective of the product, for a perceived (by the consumer) value to be found in the product. Examples of Intrinsic Value (I.V.) are license or use of a designer name, or the excess value that an ornament would impart on the product.

SELLING EXPENSE.....The amount of money added to the Prime Cost, Overhead, Trade Discount, Return on Investment Objective, (and Intrinsic Value should it exist), to pay for a salesperson's commission, and all other costs which assist in the sales of each unit of merchandise. (S.E.)

TRADE DISCOUNT.....Predicated upon custom and tradition within each merchandise category, the amount of money added to the prime cost, overhead, return on investment objective, (intrinsic value should it exist), and all other costs which assist in the sales of each unit of merchandise, to cover discounts offered to the retailer. Usually, the Trade Discount (T.D.) is intended to influence rapid payment for the merchandise, or may be used as an incentive for volume purchases.

MANUFACTURING INCOME.....The Wholesale Selling Price less the Trade Discount, Selling Expense, and Intrinsic Value (should it exist) equals the Manufacturing Income (M.I.).

QUANTITY REQUIRED.....The number of units of merchandise (Q.Req.) which must be sold to cover the cost of Overhead and Return on Investment Objective when determining the Annual Sales Volume requirements or the number of units of merchandise which must be sold to cover the Cost of Overhead when determining the Break Even Point.

ANNUAL SALES VOLUME.....The total sales dollars a company must generate to cover Prime Cost, Overhead, Intrinsic Value (should it exist), Selling Expense, and Trade Discounts for merchandise sold. (A.S.V.)

BREAK EVEN POINT.....The annual sales income required to

cover prime cost, overhead, intrinsic value (should it exist), selling expense, and trade discounts for merchandise sold. (B.E.)

WHOLESALE SELLING PRICE TO PRIME COST

FACTOR.....A number, which when applied to the Wholesale Selling

Price, will result in the appropriate Prime Cost.(W.S.P./P.C.)

CARRYING COST.....The financial cost which reflects goods and

services paid for, but not sold, when work-in-process and/or finished product is held in inventory. This may be computed as 50% of inventory value annually for typical facilities with a 12 week production cycle from cutting to shipping. (The Carrying Cost, C_c., is not included in initial determination of the Mark-Up Factor, but in the reevaluation of the M.U. factor over time)

WHOLESALE SELLING PRICE

Prime Cost x Mark-Up Factor = Wholesale Selling Price

$$PC \quad \times \quad MU \quad = \quad WSP$$

THE WHOLESALE SELLING PRICE FORMULA

Unit Prime Cost	Overhead Per Unit	Return on Investment Obj./Unit	Sales Expense	Trade Disc.	Carry Cost	Intrins. Value	Wholesale Selling Price
	+	+	+	+	+	+	=

$$PC + OH + ROIO + SE + TD + Cc + IV = WSP$$

PRIME COST

The Prime Cost may be established, for the purpose of estimation of annual production, by multiplying the Target Wholesale Selling Price by a Prime Cost Ratio. This Ratio may vary from 40% to 60% of the W.S.P.

Prime Cost per Unit	=	Prime Cost Ratio	x	Target Wholesale Selling Price

Example 1:
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PC = 45% x $24.75
PC = .45 (24.75)
PC = 11.1375 = 11.14
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In practice, the **Prime Cost** may be established in one of several ways.

1. Package Price:

     The manufacturer may purchase complete garments from an outside source who, in fact, may be a sub-manufacturer. This source provides the fabric, assembles the complete garment, and ships the complete garment to the manufacturer. Therefore, the Package Price (P.P.) is the Prime Cost.

Note: This Package Price includes the sub-manufacturer's mark-up over the cost of raw materials and direct labor for Overhead and Profit.

$$PC = PP$$

2. Raw Materials + Direct Labor:

     If the manufacturer owns cutting and sewing facilities, costs can be best controlled and evaluated. The Prime Cost is equal to the cost of the raw materials (fabric, lining, interlining, thread, notions, etc.) added to the actual cost of the direct labor to manufacture the garment. The Raw Material cost should include freight charges incurred moving raw materials from the supplier to the manufacturing facility.

$$PC = RM + DL$$

3. Raw Materials + Factory Costs:

     If the manufacturer purchases the raw materials and uses a sub-contractor for cutting and/or sewing, the Prime Cost is the cost of the raw materials added to the Cost from the sub-contractor for their services.

Note: This Factory cost is the sub-contractor's Direct Labor Cost + the sub-contractor's Mark-up for Overhead and Profit.

$$PC = RM + FC$$

$$PC + RM + (FDL + FOH + FROIO)$$

DEVELOPMENT OF DIRECT LABOR COST AND TIME STUDY

TIME STUDY DEFINITIONS

Element: A series of therbligs with a definite starting and stopping point. It is a part of a job.

Cycle: A series of elements with a definite starting and stopping point. It is the total job.

R-Read Point: The point in time at which an element occurs that is recorded on the time study form when making a time study using the continuous time recording method.

T - Time: The time value for the element. It is obtained by subtracting the previous R (Recorded Time) value from the following R (Recorded Time) Value.

Average Time: The modal average taken from the T values in an array of time values. The chosen value should produce confidence through array frequency compactness.

Array Frequency Compactness: This condition exists when 80% of the values in the array are within + or - .025 (numeric) of themselves. When this is the case we can be confident that our predictor (the normal time) will be correct 95% of the time.

Leveling Factor: The time study annalists assessment of skill and effort exhibited by the worker when performing the job (rating the operator) being time studied, converted into a mathematic value.

Normal Time: The time required by the (Average, Average, Average), normal worker to perform an element of work. This is the average time after it has been adjusted by the leveling factor.

Allowance Factor: In recognition that there is a build up of physiological and psychological cost, as well as both avoidable and unavoidable delay, associated with work, this is the percentage of time given to the worker to account for these costs.

Standard Time (Time Standard): The time in which a job should be performed by the average worker, expending an average amount of effort and utilizing an average amount of skill. This time includes all allowances. The time for bundling (should it be necessary), may be included as a part of the allowance factor, or it may be an additional time value.

Standard Allowed Minutes (S.A.M.): The standard time for a job expressed in minutes.

Standard Allowed Hours (S.A.H.): The standard time for a job converted to a fraction of an hour.

S.A.M. / min in one hour = S.A.H.

Guaranteed Wage: The <u>minimum</u> amount of money a worker <u>must be paid</u> for working a <u>specific</u> amount of time.

Piece Rate: Payment the worker receives for each unit of work produced.

Base Wage: (Yield) The amount of money a worker <u>should be able to earn</u> working at a normal (average) work pace in a piece rate payment system.

Make-up Pay: The difference between the amount of money a worker earns (on Piece Work) and the guaranteed wage.

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HOW TO SET PIECE RATES

Guaranteed wage x Standard time = Piece rate

HOW TO SET AN INCENTIVE BASED PIECE RATE

Base wage (Yield) x Standard time = Incentive Piece Rate

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HOW TO CALCULATE PRODUCTIVITY
(within a given amount of time)

TIME IN QUESTION / STANDARD OPERATION TIME = PRODUCTIVITY WITHIN THAT TIME

MINUTES   /   S.A.M.   = PRODUCTIVITY WITHIN THAT TIME

OR

HOURS   /   S.A.H.   = PRODUCTIVITY WITHIN THAT TIME

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HOW TO COMPUTE ANNUAL OVERHEAD (FIXED OR BURDEN) COST PER UNIT OF PRODUCTION

total annual overhead or fixed burden cost	/	total # of working days in year	=	daily overhead or fixed burden cost

daily overhead or fixed burden cost	/	the # of garments to be produced (at standard) in a work day	=	the per unit $ of production overhead (fixed or burden) cost

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HOW TO COMPUTE THE NUMBER OF WORKERS - MACHINES REQUIRED TO PRODUCE (AT STANDARD) A SPECIFIED # OF GARMENTS IN A WORK DAY

the total standard time for the garment	x	the # of garments to be produced (at standard) in work day	=	total time required for production of a specific # of garments

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HOW TO COMPUTE THE NUMBER OF GARMENTS TO BE PRODUCED (AT STANDARD) IN A WORK DAY IN A FACTORY FOR A SPECIFIC STYLE

| the hours worked in a day | x | number of direct labor workers | = | the # of worker-machine hours required in a day |

| the # of worker-machine hours required in a day | x | the total standard time for the garment | = | the # of garments to be produced (at standard) in work day |

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HOW TO COMPUTE THE TOTAL COST PER GARMENT OF DIRECT LABOR

$$\text{direct labor min./gmt} \quad x \quad \frac{\$ \text{ dollars/hour}}{60 \text{ minutes/hour}} = \$ \text{ direct labor/garment}$$

$$\$ \text{ direct labor per garment} + \text{per unit of production overhead (burden cost)} \times (\$DL/gmt) = \text{total direct labor } \$/\text{garment}$$

$$9.05 \text{ min/gmt} \quad x \quad \frac{\$6.00/\text{hour}}{60 \text{ minutes/hour}} = \$DL/gmt$$

$$9.05 \text{ min/gmt} \quad x \quad \$.10/\text{min} = \$.905/gmt$$

$$\$.905/gmt + .28 (\$1.20) = \$1.16/gmt$$

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COST ESTIMATION OF FABRIC

marker length	+	catcher & section allowance	+	end cutting allow.	+	stretch index factor	+	damage allowance %	+	ends allow. %	=	total spread length
30 yds	+	2"	+	3"	+	2% (30)	+	3% (30)	+	1% (30)		
30 yds	+	.055 yd	+	.083 yd	+	.60 yd	+	.9 yd	+	.3 yd	=	31.938 yd

Given a marker utilization of 80% and a fabric width of 72" (2 yards wide)
Fabric width x total spread length = total actual fabric area for the
              marker 2 yds x 31.938 yds = 63.876 sq. yds.

If the fabric cost is per lineal yard,

Total spread length x cost/lin yd. = total cost/marker

31.938 yards   x $10.00/lin yd. = $319.38/marker length

For the fabric cost /garment

fabric cost marker length/# of garments/marker = fabric cost/gmt.

$319.38   /   32   = $9.98/garment

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   If the marker length is unknown; estimate the pattern area for the
   median size

   Given:  1.5 square yards (sq yds)/garment pattern

                              1
      pattern area  x     --------        =    1.875 sq yds/gmt
                            marker
                          efficiency


                              1
      1.5 yards      x     --------        =    1.875  sq yds/gmt
                            .80


   Given:  the spreading ratio requires 32 garments in the marker,

      Garment area      x    # of garments  = total sq yds required/marker

      1.875 sq yd/gmt x      32 gmts        =   60 sq yds required


      total square yards required
      --------------------------------   =   Marker Length
               marker width


                       72"
      60 sq yds/     ---------    =    marker length
                     36"/yd


      60 sq yds/     2 yds     =    30 yds
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OVERHEAD:

Overhead is a major cost factor. Continually changing, this factor
must be adjusted regularly to ensure that costs are properly computed.
As an individual factor, Overhead may be from 50% to over 100% of the
Prime Cost. Overhead may be applied once as a single factor
(typically in simple operations) or it may be separated and applied to
individual cost centers in the manufacturing operation (i.e.: Cutting,
Sewing, Pressing, Warehousing, etc.) Using separate Overhead factors
is more complicated, but allows better cost control throughout the
operation.

Overhead is those cost factors of doing business which cannot be
directly applied to each unit of production. Overhead factors are
either fixed or variable in relation to the number of units sold.
Refer to EXAMPLE A for examples of Overhead factors.

EXAMPLE A

OVERHEAD ANALYSIS - Estimations per annum

	Total
Indirect Wages (labor) $1,500,000.00	$1,500,000.00
Fringe Benefits (Burden) 28%	$420,000.00
Rent 2500 square ft. @ $32.00/sq.ft.	$80,000.00
Electric/Heat/Telephone $55,000.00/month	$660,000.00
Sales Promotion $2,100,000.00	$2,100,000.00
Mark Downs & Write offs $350,000.00	$350,000.00
Interest Expense 12% of $2,450,000.00 invested	$300,000.00
Depreciation Exp. M & E $400,000.00	$400,000.00
Professional Services $325,000.00	$325,000.00
Miscellaneous (10%) $600,000.00	$600,000.00
TOTAL OVERHEAD	$6,735,000.00

Return-on-Investment Objective

PROFIT is a measure of the expected financial gain achieved from a financial investment. This is expressed as the Return-on-Investment Objective, or ROIO.

EXAMPLE

Investment in the business.....$2,450,000.00

Expected return on the investment made = 20% return.

$$ROIO = INV. \quad X \quad RETURN\ \%$$

ROIO = $2,450,000.00 X .20
ROIO = $490,000.00

Sales Income

Sales Income is the business income from sales which represents the Prime Cost + Overhead + Return-on-Investment-Objective. It is best estimated by deducting the Sales Expense (as a % of WSP), the Trade Discount (as a % of WSP) and Shipping Expense (Freight-In) from the Target Wholesale Selling Price (WSP).

Sales income = Wholesale selling - trade disc. - selling expense
price

$$SI = WSP - TD - SE$$

EXAMPLE

WSP target = 24.75
TD = 8%
SE = 5%

SI = (WSPt x (1 - TD)) x (1 - SE)
SI = (24.75 x (1 - .08)) x (1 - .05)
SI = (24.75 - 1.98) x (1 - .05)
SI = (22.77) x (1 - .05)
SI = (22.77) x (1.138)
SI = 21.631

NUMBER OF UNITS OF PRODUCTION TO COVER EXPENSES

$$\frac{\text{annual overhead} + \text{Annual ROIO}}{\text{sales income} - \text{prime cost}} = \text{minimum units of production to cover expenses (Q.Req.)}$$

EXAMPLE

$$\frac{\$6,735,000.00 + \$490,000.00/yr}{\$21.631 - \$11.14/unit} = 688,685.54 \text{ units/year}$$

$$\$10.491/unit$$

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WHOLESALE SELLING PRICE FORMULA

$$PC + OH + ROIO + SE + TD + (IV) + (Cc) = WSP$$

$$\frac{\$6,735,000}{688,685.54} \quad \frac{\$490,000}{688,685.54}$$

$$\searrow \qquad \swarrow$$

$$\$11.14 + \$9.779 + \$.711 + \$1.138 + \$1.98 + (IV) + (Cc) = \$24.75 \text{ WSP}$$

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MARK UP FACTOR

$$\frac{WSP}{PC} = \text{MARK UP FACTOR (MU)}$$

$$\frac{\$24.75}{\$11.14} = 2.22 \text{ (MU)}$$

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APPLICATION OF MARK-UP FACTOR TO NEW PRIME COST

$$\text{New PC} \times 2.22 \text{ (MU)} = \text{New WSP}$$

    Once the Mark-Up Factor is established, it is a simple procedure to
Multiply the Prime Cost of each new Style by the Mark-Up Factor. This will
reliably determine the minimum Wholesale Selling Price to charge for that Style.

EXAMPLE

New Raw Materials Cost: $6.25
New Direct Labor Cost: $3.50
   Total PC $9.75

$$\text{New PC} \times 2.22 \text{ (MU)} = \text{New WSP}$$

$$\$9.75 \times 2.22 = \$21.645$$

BREAK EVEN POINT

The point at which Sales Income (Wholesale Selling Price less Trade Discount and direct Selling Expense), equals the total costs (fixed and variable) accrued in the production of the product being sold. The business has neither achieved a return on its investment nor depleted its investment base. (It has not made or lost money) Exceeding the break even point by even one unit will then produce a profit for the business.

BREAK EVEN CHART

Dollars x 1000

No. of Units (Sold/Mfgd.)
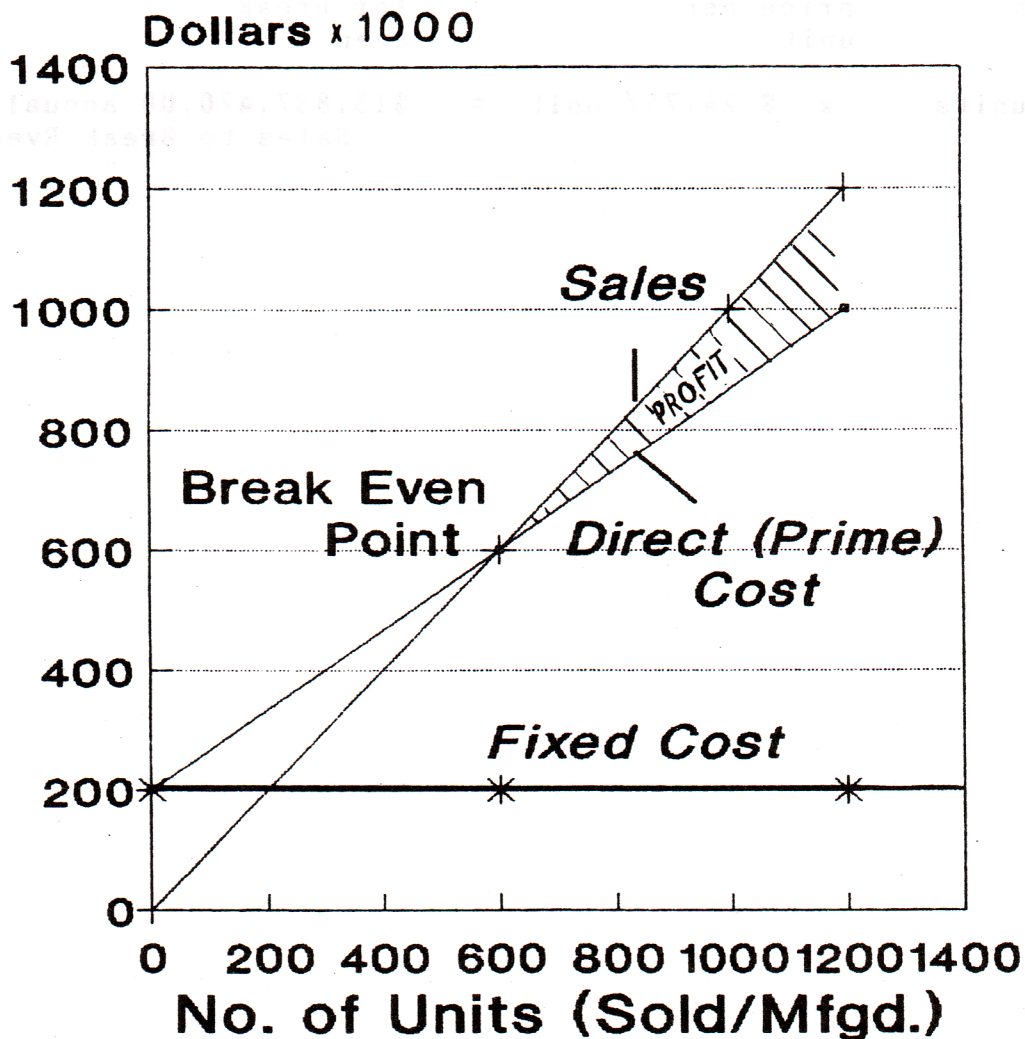
THE BREAK EVEN FORMULA

Wholesale selling price per unit		Trade discount per unit		Selling expense per unit		Intrinsic value per unit		Manufacturing income per unit
WSP	-	TD	-	SE	-	IV	=	MI
$24.75	-	1.98	-	1.138	-	IV	=	$21.632

$$\frac{\text{Annual overhead}}{\text{Manufacturing income per unit} - \text{Prime Cost per unit}} = \text{annual quantity required for break even}$$

$$\frac{6,735,000}{21.632 - 11.14} = 641,918 \quad \text{Units for Break Even}$$

10.492

annual quantity required for break even		wholesale selling price per unit		annual sales volume for break even
	x		=	
641,918 units	x	$ 24.75/ unit	=	$15,887,470.00 annual Sales to Break Even