WASTE MULTIPLIER IN COSTING FOR RAW MATERIAL WASTAGES IN SPINNING TEXTILE UNITS

When reporting on the productivity of the spinning unit of a textile unit, a cost auditor has to analyse the yarn realization, where wastage is the determining factor. Yarn realization is an important yardstick of the unit's performance

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IN many continuous process industries cost data are arrived at with complexities in the calculation. The intention of this article is to help the beginners, either students/trainees or starters of the costing profession. Hence it is given in simple manner. They must be aware of the principles associated with costing the products. Waste emerging out of the various process of the company cannot be ignored easily. Waste multipliers are designed to have accuracy in costing various products. This is in reality provides the true cost and the basis of how the final output is to be valued if the product is subject to different stages of manufacturing process. I have taken an example of typical industry i.e Spinning Textile unit. I have explained the subject with proper tables which will be more helpful to understand. The main purpose of it is to avoid confusion in handling the technique in costing.

A Spinning unit of Cotton Textile Industry has a set of processing departments like Mixing and Blow Room, Carding, Drawing, Combing, Fly Frames and Ring Frames. Actually spinning unit comes under continuous process industry. Mixing and Blow Room are the starting point when the raw material cotton enters and comes out as yarn in the Ring Frame section. Obviously like every processing industry in spinning mills certain amount of wastage is emerging out of production in each and every department. It is segregated as usable waste and saleable waste apart from invisible loss. While the usable waste and saleable waste can measured physically the invisible loss is found out from the input and output of raw materials after considering due weightage of usable and saleable waste. The actual waste which is extracted from the machine process depends upon the impurities in the cotton.

The production process involving wastage has a routine or cycle. For example the output of Blow Room goes to Carding and usable waste of Carding goes back to the cotton mix in Mixing and Blow Room and so on. The 'back' and 'forth' waste movement are given due consideration while calculating the raw material cost. The realization of saleable waste is given due credit in the cost of raw material consumed. Waste multiplier is the quantity of output from one process which is required to get one unit of final output. It is explained in a simple manner for the starters of our costing profession and for the student generation as well.

Two assumptions are made in the illustration.

1. Saleable waste is realized in the same month.
2. One mix/count is assumed for production i.e 14s. (In reality more than one mix is processed in a spinning mill e.g coarser count is used for bed sheets and finer count is used for

shirting etc.)

Table A is showing the input/output of cotton processed in the each and every department or cost centre. In Ring Frame dept. it comes in the form of Yarn product wound over the spindles. From this spindle it takes the form of cone in Cone winding section. Finally these cones are used in weaving the cloth in the next major processing which converts yarn into grey/plain cloth.

As shown in Table B the production in Blow Room is 92.5524%, in Carding 94.2599% and so on. It should be noted that this percentage is for the output in the 'concerned cost centre'. But when we count the input to a particular cost centre we have to measure it as output from the previous cost centre. For example Blow room output serves as Carding section input. Hence initially for input of 100% the output is 92.5524% in Blow Room resulting in no change in the output percentage. Again for 92.5524% input in the next processing section, the net output is arrived at by using 92.5524% multiplied by the result of 94.2599% and divided by 100 to arrive at the exact output which is 87.2397%. So in this sequence we are getting 86.9640% in Drawing section, 85.1691% in Simplex section, 81.0223% in Ring frame, 80.4016% in Cone winding.

In **Table B,** Column (c) is calculated by dividing each net output of column (b) with the output of last cost centre namely Cone winding in the same column so as to give final effect to the input. Hence first item 100 is divided by last item 80.4016 to get the waste multiplier of 1.2440. Second item of 92.5524 is divided by same last item 80.4016 to arrive at the waste multiplier of 1.1513 and so on. The alternate method is shown below in Table

A. Table showing Input / Output in each processing cost centre up to the stage of Yarn Production of XYZ Spinning Mills

	Blow Room		Carding		Drawing		Simplex		Ring Frame		Cone Winding	
	Kgs	%	Kgs	%	Kgs	%	Kgs	%	Kgs	%	Kgs	%
Prodn	59240	92.5524	54289	94.2599	53922	99.6839	50676	97.9360	45681	95.1311	44818	99.2339
Saleable Waste	4262	6.6586	2449	4.2521	19	0.0351	94	0.1817	1221	2.5427	346	0.7661
Usable Waste	0	0	857	1.4880	152	0.2810	974	1.8823	1117	2.3262	0	0.00
Invisible Loss	505	0.7890	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total Wastage		7.4476		5.7401		0.3161		2.064		4.8689		0.7661
Net Input	**64007**	**100.00**	**57595**	**100.00**	**54093**	**100.00**	**51744**	**100.00**	**48019**	**100.00**	**45164**	**100.00**

B. Table showing Waste Multipliers for each Cost Centre

	Actual output	Net output for 1unit of Input	Waste Multiplier
	(a)	(b)	(c)
Mixing14s		100.00	1.2440
Blow Rm	92.5524	92.5524	1.1513
Cardg	94.2599	87.2397	1.0852
Drawg	99.6839	86.9640	1.0817
Simplx	97.9360	85.1691	1.0593
Ring Fram	95.1311	81.0223	1.0077
Con wndg	99.2339	80.4016	1.0000

C. Table showing Waste Multipliers for each Cost Centre

	%	% of All Wastage of Input	% Net Output (a-b)	100/(c)	Waste Mutiplier
	(a)	(b)	(c)	(d)	(e)
Mixing 14s					1.2440
Blow Room	100.00	7.4476	92.5524	1.0805	1.1513
Carding	100.00	5.7401	94.2599	1.0609	1.0852
Drawing	100.00	0.3161	99.6839	1.0032	1.0817
Simplex	100.00	2.0640	97.9360	1.0211	1.0593
Ring Frame	100.00	4.8689	95.1311	1.0512	1.0077
Cone Wndg	100.00	0.7661	99.2399	1.0077	1.0000

C for easy understanding of the working. Please note that the decimal fractions are rounded up.

From **Table B and Table C** we can see the same waste multiplier is arrived at by two alternate methods in the cost centres. In the Mixing section of cotton the cumulative effect of wastage produced in various departments is taken into account i.e 1.2440. This will be used ultimately with the cotton cost to get the 'Clean Cotton Cost' which will be applied for the end product, Yarn. This material cost will be having the cushion of wastage in each cost centre/dept. In Table C the starting point of calculation is taking one unit (1.000) of final output from cone winding and multiplying it with column (d) like when 1.000 is multiplied with 1.0077 we get the result as 1.0077 and when 1.0077 is multiplied with 1.0512 we get the result as 1.0593 and so on. It should be noted each waste multiplier has the cumulative effect in descending order.

Let us assume the net cotton cost for 14s mixing is Rs 200 per kg after giving credit to the saleable waste. Applying the waste multiplier of 1.2440 which is derived in column (e) above the Cost of mixing per kg of yarn will be Rs 248.80. We can see the difference between the cotton cost for the mixing and that of end product, Yarn. The more the mix/count of cotton used the more will be the complexity of calculation of yarn cost. Now-a- days so many matrixes are used to arrive at the net cost of the product. These are all system based standards developed by different Textile Research Associations like Ahmadabad Textile Research Association (ATIRA).

After getting the Raw Material cost the conversion cost per kg of yarn is arrived at. The conversion cost consists of wages and salaries, Utilities, consumable stores, Repairs and maintenance, production overhead, depreciation, other direct expenses etc as appear in para 5 of abridged cost statement of cost audit annexture excluding material cost. While calculating the conversion costs due weightage for waste multiplier at each process is to be considered. In other words conversion cost is suitably inflated so as to take care of wastages emerging out of the each process. The sum of conversion costs as per the sequence of operations is the conversion cost for final output - yarn. Finally conversion cost of yarn per kg is arrived at Rs. 91.6084 for the mix/count of 14s as shown in **Table D**. This principle of arriving conversion cost applies to the similar processing industries which are having continuous operations. The waste multiplier gives the accuracy in the calculation of conversion cost taking into consideration the various processes involved and their wastages subject to which raw material takes the shape of final output. This is widely accepted in the textile industry for costing the product.

D. Statement showing production per Spindle shift and the respective Conversion Cost per Kg

	ConvCost	Prodn Kg	Convcost/ Kg	W.Mutiplr	Convcost/Kg
	/spl shift	/spl shift			to be applied
Mixing 14s					
Blow Rm	8526.356	1161.5600	7.3404	1.1513	8.4513
Cardg	1368.431	97.9945	13.9644	1.0852	15.1536
Drawg	554.074	104.7035	5.2918	1.0817	5.7243
Simplx	45.211	2.7400	16.5004	1.0593	17.4787
Ring Fram	9.302	0.3430	27.1195	1.0077	27.3289
Con wndg	103.333	5.9143	17.4717	1.0000	17.4717
			87.6883		**91.6084**

Now both raw material cost and conversion cost are added up to arrive at total cost of unpacked yarn per kg, which is Rs 340.41 (248.80+91.61). This is the case of 14s count i.e Coarser count. Similarly for all counts, coarser or finer, the yarn cost can be calculated depending upon the wastage coming out of each process with the use of waste multiplier.

For valuation of Work-in-Process these waste multipliers are useful in finding out the accurate rate to be applied for each stage of product. As on the cut off date the WIP may be lying in each stage of the process. The cost data available in each cost centre for both raw material and conversion cost is helpful in working out the WIP without any difficulty. Cost auditor can rely upon the rate arrived to calculate the stock of Textile Yarn with the above information available to him.

When making the report especially PAR on the productivity of the spinning unit of a textile industry a cost auditor has to analyse the yarn realization. The wastage is the determining factor for yarn realization. The concept of yarn realization is an important parameter or yard stick with which performance of the unit is measured. The yarn realization may be high or low with different mixing of raw material. Certain Standards or Norms are set by some reputed associations for yarn realization for different counts as a quality control measure which a cost auditor can refer to for his in depth analysis. MA

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