# CHAPTER 10

# STANDARD COSTS AND VARIANCES

I. Standard costs

II. Setting standard costs

III. Computing variances

IV. Potential problems with standard costs

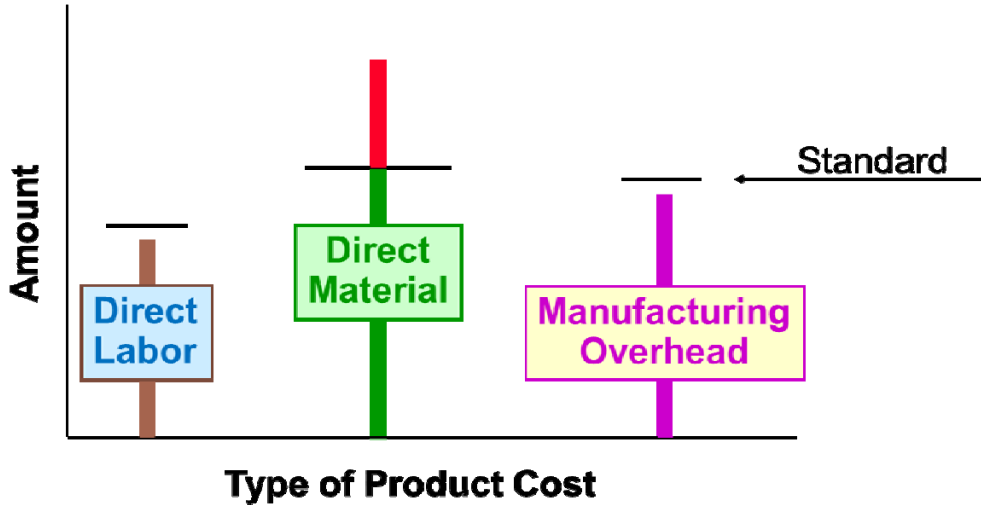
## I. STANDARD COSTS

A standard is a benchmark or "norm" for measuring performance.

Two types of standards:

Price standard: How much an input should cost.

Quantity standard: How much of a given input should be used to make a unit of output.



## II. SETTING STANDARD COSTS

### IDEAL VERSUS PRACTICAL STANDARDS

Ideal standards allow for no machine breakdowns or work interruptions, and can be attained only by working at *peak effort 100% of the time*. Such standards:

- often discourage workers.
- shouldn't be used for decision making.

Practical standards allow for "normal" down time, employee rest periods, and the like. Such standards:

- are felt to motivate employees, since the standards are "*tight but attainable*."
- are useful for decision-making purposes, since variances from standard will contain only "abnormal" elements.

### DIRECT MATERIAL STANDARDS

The standard price per unit for direct materials should be the final, delivered cost of materials. The standard price should reflect:

- Specified quality of materials.
- Discounts for quantity purchases.
- Discounts for early payment, if any.
- Transportation (freight) costs.
- Receiving and handling costs.

**EXAMPLE:** Speeds, Inc. makes a popular jogging suit. The company wants to develop standards for material, labor, and variable manufacturing overhead.

A material known as verilon is used in the jogging suits. The standard price for a yard of verilon is determined as follows:

| | |
|---|---|
| Purchase price, top grade verilon | $5.70 |
| Less purchase discount in 20,000 yard lots | (0.20) |
| Shipping by truck | 0.40 |
| Receiving and handling | 0.10 |
| Standard price per yard | $6.00 |

The standard quantity per unit for direct materials is the amount of material that should go into each finished unit of product. The standard quantity should reflect:

- Engineered (bill of materials) requirements.
- Expected spoilage of raw materials.
- Unavoidable waste of materials in the production process.
- Materials in expected scrapped units (rejects).

**EXAMPLE:** The standard quantity of verilon in one jogging suit is computed as follows:

| | |
|---|---|
| Bill of materials requirement | 2.8 yards |
| Allowance for waste | 0.6 yards |
| Allowance for rejects | 0.1 yards |
| Standard quantity per jogging suit | 3.5 yards |

Once the price and quantity standards have been set, the standard cost of materials (verilon) for one unit of finished product can be computed:

| | | |
|---|---|---|
| **Standard quantity of materials used per unit of product** | **×** | **Standard cost (price) of materials per unit of materials** |

## DIRECT LABOR STANDARDS

The standard rate per hour for direct labor should include all the costs of direct labor workers, including:

- Hourly wage rates.
- Fringe benefits.
- Employment taxes.

Many companies prepare a single standard rate for all employees in a department, based on the expected mix of high and low wage rate employees. This procedure:

- Simplifies the use of standard costs
- Allows monitoring the actual mix of employees in the department

**EXAMPLE:** The standard rate per hour for the expected labor mix is determined by using average wage rates, fringe benefits, and employment taxes as follows:

| | |
|---|---|
| Average wage rate per hour | $13 |
| Average fringe benefits | 4 |
| Average employment taxes | 1 |
| Standard rate per direct labor hour | $18 |

The standard direct labor-hours per unit specifies the amount of direct labor time required to complete one unit of product. This standard time should include:

- Engineered labor time per unit.
- Allowance for breaks, personal needs, and cleanup.
- Allowance for setup and other machine downtime.
- Allowance for rejects.

**EXAMPLE:** The standard hours required to produce a jogging suit are determined as follows:

| | |
|---|---|
| Basic labor time per unit | 1.4 hours |
| Allowance for breaks and cleanup | 0.1 hours |
| Allowance for setup and downtime | 0.3 hours |
| Allowance for rejects | 0.2 hours |
| Standard hours per jogging suit | 2.0 hours |

Once the time and rate standards have been set, the standard cost of labor for one unit of product can be computed:

Standard hours per unit of product × Standard rate of direct labor hour

## VARIABLE OVERHEAD STANDARDS

There may be standards for variable overhead, as well as for direct materials and direct labor. The standards are typically expressed in terms of a "rate" and "hours," much like direct labor.

- The "rate" is the variable portion of the predetermined overhead rate.
- The "hours" represent whatever base is used to apply overhead cost to products. Ordinarily, this would be direct labor-hours or machine-hours.

**EXAMPLE:** Speeds, Inc. applies overhead cost to products on the basis of direct labor-hours. The variable portion of the predetermined overhead rate is $4 per direct labor-hour. Using this rate, the standard cost of variable overhead for one unit of product is:

2.0 hours per jogging suit × $4 per hour = $8 per jogging suit.

## STANDARD COST CARD

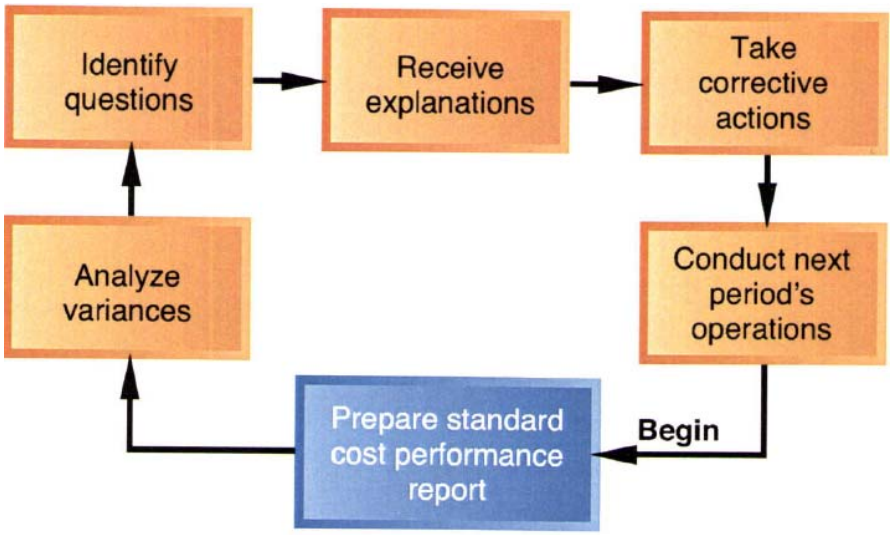
After standards have been set for materials, labor, and overhead, a standard cost card is prepared. The standard cost card indicates what the cost should be for a completed unit of product.

EXAMPLE: Referring back to the standard costs computed for materials, labor, and overhead, the standard cost for one jogging suit would be:

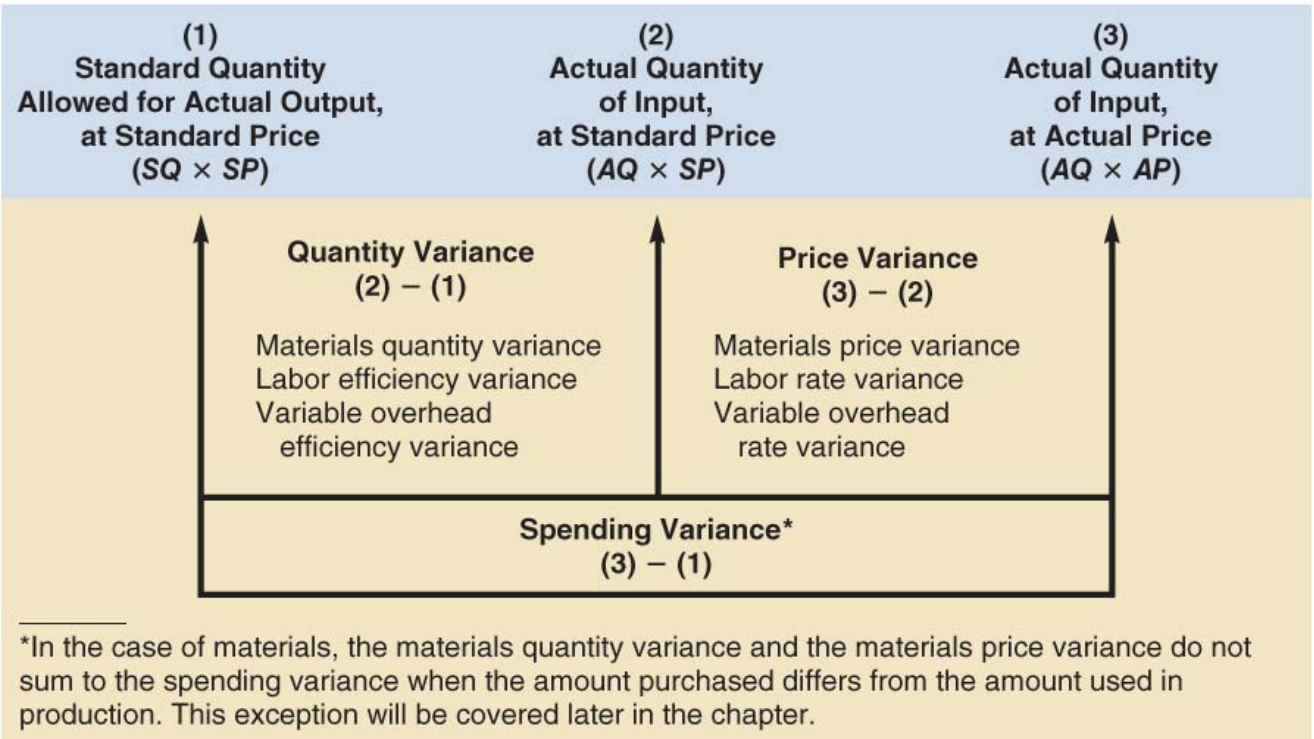
*Standard Cost Card for Jogging Suits*

| | *(1) Standard Quantity or Hours* | *(2) Standard Price or Rate* | | *Standard Cost (1) × (2)* |
|---|---|---|---|---|
| Direct materials | 3.5 yards | $6 | per yard | $21 |
| Direct labor | 2.0 hours | $18 | per hour | 36 |
| Variable manufacturing overhead | 2.0 hours | $4 | per hour | 8 |
| Total standard cost per suit | | | | $65 |

## III. COMPUTING VARIANCE




### THE GENERAL MODEL OF VARIANCE ANALYSIS




The standard quantity allowed (standard hours allowed in the case of labor and overhead) is the amount of materials (or labor) that should have been used to complete the output of the period.

## 4.2. DIRECT MATERIAL VARIANCES

To illustrate variance analysis, refer to the standard cost card for Speeds, Inc.'s jogging suit. The following data are for last month's production:

| | |
|---|---|
| Number of suits completed | 5,000 units |
| Cost of material purchased (20,000 yards × $5.40 per yard) | $108,000 |
| Yards of material used | 20,000 yards |

Using these data and the data from the standard cost card, the material price and quantity variances are:

| **Actual Quantity of Inputs, at Actual Price** **(AQ × AP)** | **Actual Quantity of Inputs, at Standard Price** **(AQ × SP)** | **Standard Quantity Allowed for Actual Output, at Standard Price** **(SQ × SP)** |
|---|---|---|

F = Favorable
U = Unfavorable

The direct material variances can also be computed as follows:

MATERIAL PRICE VARIANCE (MPV):

• *Method one:*

MPV = (AQ × AP) – (AQ × SP)

= ($108, 000) – (20,000 yards × $6.00 per yard)

= $12,000 F

• *Method two:*

MPV = AQ (AP – SP)

= 20,000 yards ($5.40 per yard – $6.00 per yard)

= $12,000 F

The material price variance should be recorded at the time materials are purchased. This permits:

- Early recognition of the variance.
- Recording materials at standard cost.

MATERIAL QUANTITY VARIANCE (MQV):

• *Method one:*

MQV = (AQ × SP) – (SQ × SP)

= (20,000 yards × $6.00 per yard) –
(17,500 yards* × $6.00 per yard)

= $15,000 U

*5,000 suits × 3.5 yards per suit = 17,500 standard yards

• *Method two:*

MQV = SP (AQ – SQ)

= $6.00 per yard (20,000 yards – 17,500 yards)

= $15,000 U

**DIRECT LABOR VARIANCES**

The following data are for last month's production:

| | |
|---|---|
| Number of suits completed (as before) | 5,000 units |
| Cost of direct labor (10,500 hours @ $20 per hour) | $210,000 |

Using these data and the data from the standard cost card, the labor rate and efficiency variances are:

| **Actual Hours of Input, at the Actual Rate** | **Actual Hours of Input, at the Standard Rate** | **Standard Hours Allowed for Actual Output, at the Standard Rate** |
|---|---|---|
| **(AH × AR)** | **(AH × SR)** | **(SH × SR)** |

The direct labor variances can also be computed as follows:

LABOR RATE VARIANCE:

• *Method one:*

LRV = (AH × AR) – (AH × SR)

= ($210, 000) – (10,500 hours × $18 per hour)

= $21,000 U

• *Method two:*

LRV = AH (AR – SR)

= 10,500 hours ($20 per hour – $18 per hour)

= $21,000 U

LABOR EFFICIENCY VARIANCE:

• *Method one:*

LEV = (AH × SR) – (SH × SR)

= (10,500 hours × $18 per hour)

– (10,000 hours* × $18 per hour)

= $9,000 U

*5,000 suits × 2.0 hours per suit = 10,000 hours

• *Method two:*

LEV = SR (AH – SH)

= $18 per hour (10,500 hours – 10,000 hours)

= $9,000 U

**VARIABLE MANUFACTURING OVERHEAD VARIANCES**

The following data are for last month's production:

| | |
|---|---|
| Number of suits completed (as before) | 5,000 units |
| Actual direct labor hours (as before) | 10,500 hours |
| Variable overhead costs incurred | $40,950 |

Using these data and the data from the standard cost card, the variable overhead variances are:

| **Actual Hours of Input, at the Actual Rate** | **Actual Hours of Input, at the Standard Rate** | **Standard Hours Allowed for Actual Output, at the Standard Rate** |
|---|---|---|
| **(AH × AR)** | **(AH × SR)** | **(SH × SR)** |

The variable manufacturing overhead variances can also be computed as follows:

OVERHEAD SPENDING VARIANCE:

• *Method one:*

VOSV = (AH × AR) – (AH × SR)

= ($40,950) – (10,500 hours × $4.00 per hour)

= $1,050 F

• *Method two:*

VOSV = AH (AR – SR)

= 10,500 hours ($3.90 per hour* – $4.00 per hour)

= $1,050 F

* $40,950 ÷ 10,500 hours = $3.90 per hour

OVERHEAD EFFICIENCY VARIANCE:

• *Method one:*

VOEV = (AH × SR) – (SH × SR)

= (10,500 hours × $4.00 per hour)

– (10,000 hours** × $4.00 per hour)

= $2,000 U

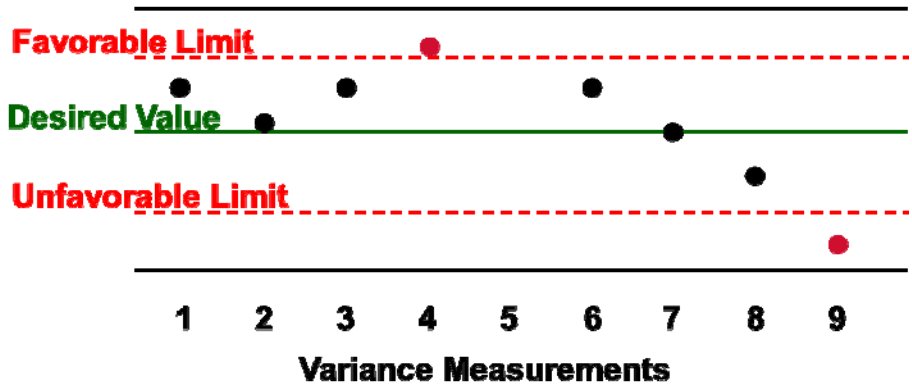
** 5,000 suits × 2.0 hours per suit = 10,000 hours

• *Method two:*

VOEV = SR (AH – SH)

= $4.00 per hour (10,500 hours – 10,000 hours)

= $2,000 U




**Standard cost systems offer many advantages including:**

- Standard costs are a key element of the management by exception approach which helps managers focus their attention on the most important issues.
- Standards that are viewed as reasonable by employees can serve as benchmarks that promote economy and efficiency.
- Standard costs can greatly simplify bookkeeping.
- Standard costs fit naturally into a responsibility accounting system.

## IV. POTENTIAL PROBLEMS WITH STANDARD COSTS

- Variances are often reported too late to be useful.
- If used as a tool for punishing people, standards can undermine morale.
- Labor efficiency standards encourage high output. This may lead to excessive work-in-process if a workstation is not a bottleneck.
- A favorable quantity variance may be worse than an unfavorable quantity variance.
- Quality may suffer if undue emphasis is placed on just meeting the standards.
- Just meeting standards may not be sufficient; continual improvement is often necessary.