Management by exception is where managers direct their attention to those areas that fall outside acceptable limits (standards). So to tell whether something falls outside acceptable limits, standards must be set. A standard is a predetermined price and quantity of input for producing an output. For example, how much should the material cost and how much should be used to produce a unit, or several units.

Technically, a standard is a measure for one, where a budget is a measure for many. (One versus total.) Often we will use the term standard to mean many, but keep in mind the true definition.

Ideal standards are not reachable and most managers don't like to use them because of this.

Practical standards are reachable but only if everything goes very well. Most managers use practical standards.

Setting standards will not be our goal. We will analyze the deviations (variances) from standards. I.e., the difference between actual and standard or actual and budget is variance analysis.

Eight variances will be studied over chapters 10 & 11. They are:

<table>
<thead>
<tr>
<th>Cost Standards</th>
<th>Quantity Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>Price</td>
</tr>
<tr>
<td>DL</td>
<td>Rate</td>
</tr>
<tr>
<td>VFOH</td>
<td>Spending</td>
</tr>
<tr>
<td>FFOH</td>
<td>Budget</td>
</tr>
</tbody>
</table>

We'll use the model approach to quantify the variances. From the model we can derive the formula, or memorize it if you will, but the model is somewhat superior because of the visual aid it provides when doing textbook type problems, especially when trying to determine missing numbers or relationships.

**Direct materials:**

\[
\begin{align*}
\text{AQ} \times \text{AP} & \quad \text{AQ} \times \text{SP} \quad \text{SQ} \times \text{SP} \quad (# \text{units produced} \times \text{rate} \times \text{standard hrs.}) \\
\mid & \quad \mid \quad \mid \\
\text{PRICE} & \quad \text{QUANTITY} & \quad \mid \\
\text{AQ(AP-SP)} & \quad \text{SP(AQ-SQ)} & \\
\end{align*}
\]
DIRECT LABOR:

\[
\begin{align*}
\text{AH} \times \text{AR} & \quad \text{AH} \times \text{SR} & \quad \text{SH} \times \text{SR} \quad \text{(# units produced x rate x standard hrs.)} \\
\text{!} & \quad \text{!} & \quad \text{!} \\
\text{! RATE ! EFFICIENCY !} \\
\text{AH(AR-SR)} & \quad \text{SR(AH-SH)}
\end{align*}
\]

VFOH:

\[
\begin{align*}
\text{Actual VFOH} & \quad \text{Revised VFOH} \\
\text{AH} \times \text{AR} & \quad \text{AH} \times \text{SR} & \quad \text{SH} \times \text{SR} \quad \text{(# units produced x rate x standard hrs.)} \\
\text{!} & \quad \text{!} & \quad \text{!} \\
\text{! SPENDING ! EFFICIENCY !} \\
\text{AH(AR-SR)} & \quad \text{SR(AH-SH)}
\end{align*}
\]

FFOH:

\[
\begin{align*}
\text{Actual FFOH} & \quad \text{Budgeted} \\
\text{Cost} & \quad \text{FFOH cost} & \quad \text{SH} \times \text{SR} \quad \text{(# units produced x rate x standard hrs.)} \\
\text{!} & \quad \text{!} & \quad \text{!} \\
\text{! BUDGET ! VOLUME !} \\
\text{AH(AR-SR)} & \quad \text{SR(AH-SH)}
\end{align*}
\]

**TWO DIFFERENT WAYS TO REMEMBER IF A VARIANCE IS FAVORABLE OR UNFAVORABLE:**

- Working from left to right, take number on left subtract the number on the right from it and if negative, it is a FAVORABLE VARIANCE; if positive, it is an UNFAVORABLE VARIANCE.

- Saying to yourself “I paid (number on left) when I should have paid (number to its immediate right).” If you paid more, that’s Unfavorable. If you paid less, that’s Favorable. E.g., if the three numbers are as follows, from left to right on the model: $40, $50 & $48, respectively. “I paid $40 when I was suppose to pay $50”, results in a $10 Favorable variance. “I paid $50 when I was suppose to pay $48”, results in a $2 Unfavorable variance.

**WHAT DO THE VARIANCES ACTUALLY MEAN USING STANDARD ENGLISH INSTEAD OF ACCOUNTING JARGON:**

- MPV means that you paid more, or less, per pound, foot, yard, etc. than projected for the materials actually purchased.
- MQV means that you used more, or less, of the materials than you projected for the given number of units actually produced.
- LRV means that you paid more, or less, per hour for the labor force (on average) than projected.
- LEV means that your labor force put in more, or less, hours of time, in total and on an average per unit basis, than projected.
- VFOH SV means that you had a combination of two occurrences. You used more, or less, and you paid more, or less, for the variable factory overhead costs.
- VFOH EV means you completed the job (products) in more time, or less time, in total and on an average basis, in terms of the underlying activity base used for applying overhead, than projected.
- FFOH BV means you spent more, or less, on fixed overhead than originally projected.
- FFOH VV means you produced more, or less, than originally projected for the period.
INTERNAL BUSINESS PROCESSES PERFORMANCE:

- PROCESS VALUE ANALYSIS (PVA) is determining VALUE ADDED and NON-VALUE ADDED activities. Idea is to eliminate Non-Value Added activities. Effects are to decrease costs and reduce time. Activities are: Process, Move, Inspect and Queue. These four activities constitute Throughput Time.

- DELIVERY CYCLE TIME: customer order until goods shipped.

- THROUGHPUT TIME: start of production until goods shipped.

- MANUFACTURING CYCLE EFFICIENCY: value added time divided by throughput time.