Measure – How are we doing?

- Key Deliverables
  - Input, Output Process Indicators
  - Operational Definitions
  - Measurement System Analysis
  - Data Measurement Plans
  - Data Collection Forms
  - Baseline Performance
Other Deliverables

- **Operational Definitions**
  - A precise definition of the specific Y to be measured

- **Data measurement Plans**
  - who, where, when the data will be collected and what will be done with data collected.

- **Measurement System Study**
  - To ensure the quality of the measurements obtained before using them in any analyses or decision-making.

- **Data collection Forms**
  - Forms to manually collect data.

- **Baseline Performance**
  - To document the “as-is” performance of the process. (Cp, Cpk etc)
Input, Output Process Indicators

- Y is an output performance measure
  - Output indicators or performance measures (Y’s) should be derived from the Voice of the Business and the Voice of the Customer.
  - Remember that “what gets measured is what gets done.” Make sure that your Y’s will drive the desired behavior.

- X’s are key input and process measures.
  - Machine Settings
  - Training Hours
  - Process Variables
Cause and Effect Diagram

Major Categories of Causes of Problem Statement

- Machine (Generic Category)
- Material (Generic Category)
- Environment (Generic Category)
- People (Generic Category)
- Method (Generic Category)

Output Variable
### Cause and Effect Matrix

<table>
<thead>
<tr>
<th>Output #1</th>
<th>Output #2</th>
<th>Output #3</th>
<th>Output #4</th>
<th>Output Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>[\text{Importance}\]</td>
</tr>
</tbody>
</table>

#### Input/Process Indicators

<table>
<thead>
<tr>
<th>Input/Process Indicators</th>
<th>Correlation of Input to Output</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>X 1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>X 2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>X 3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>X 4</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>X 5</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

**SCALE:**
- 0 = NONE
- 1 = LOW
- 3 = MODERATE
- 9 = STRONG