Capacity (LCR/MCR) & Operational Equipment Effectiveness (OEE)
LCR / MCR Definitions

- **Lean Capacity Rate** or LCR;
  - shall mean the normal weekly number of Parts that can be constantly manufactured by Supplier (without overtime or additional shifts)

- **Maximum Capacity Rate** or MCR;
  - shall mean the maximum weekly number of Parts that can be temporarily manufactured by Supplier
LCR / MCR Calculations

- **Normal Working hour**
  - 24 Hour per day
  - 5 days per week
  - 30 parts per hour

- Example 1; 24 hr X 5 days X 30 parts X 85% (World class OEE)
  - \[ LCR = 3060 \text{ parts per week} \]

- Example 2; 24 hr X 6 days X 30 parts X 85% (World class OEE)
  - Supplier does have the possibility to work an extra day per week in overtime
  - \[ MCR = 3672 \text{ parts per week} \]
What is OEE?

• OEE; Overall Equipment Effetiveness
• OEE in french is TRG; Taux de Rendement Global
• A « best practices » metric, expressed in percentage, to monitor and improve the efficiency of a manufacturing process (automated or manual)
• A tool that measures and identifies the causes of productivity losses, classifying them into three categories:
  • Availability
  • Performance
  • Quality
What are the objectives of OEE?

- Evaluate the available capacity
- Increase production capacity and consistently maintain level over time
- Generate accurate production data for improved production planning
- Identify the sources and weight of inefficiencies to allow prioritization

**Example of Calculation**

- An equipment has a theoretical cycle time of 2 minutes (30 parts/hour)
- Assuming the equipment produced 180 good parts on a 8 hour shift
- 180 good parts @ 30 parts/hour = 6 hours production

➢ 6 theoretical hours of production / 8 true hours of production X 100 = **OEE 75%**
Definitions, calculation....

- We want to calculate a single 8-hour shift OEE of an equipment that has a theoretical speed of 30 parts/hours using the following factors:
  - Loss of 3 hours due to equipment downtime
  - Loss of 25 parts during the Operating Time due to slower equipment speed
  - 5 parts did not meet quality specs and were rejected

- Availability (TU) = \[
\frac{8 \text{ hours} - 3 \text{ hours}}{8 \text{ hours}} \times 100 = 62.5\%
\]

- Performance (TP) = \[
\frac{125 \text{ parts} @ 30 \text{ parts/hr}}{8 \text{ hours} - 3 \text{ losted hours}} \times 100 = 83.3\%
\]

- Quality (TQ) = \[
\frac{125 \text{ parts} - 5 \text{ rejected parts}}{125 \text{ produced parts}} \times 100 = 96.0\%
\]

Output of 120 good parts instead of 240 (30 parts /hr X 8 hr)

OEE of 50%
What is a world class OEE?

- A World Class OEE for discrete manufacturing plants is considered to be 85% or better

<table>
<thead>
<tr>
<th>OEE Factor</th>
<th>WORLD CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEE</td>
<td>85 %</td>
</tr>
<tr>
<td>Availability</td>
<td>90 %</td>
</tr>
<tr>
<td>Performance</td>
<td>95%</td>
</tr>
<tr>
<td>Quality</td>
<td>99 %</td>
</tr>
</tbody>
</table>
TOP 6 Big Losses

- **Breakdowns**
  - Tooling and equipment failures, unexpected maintenance

- **Setups and Adjustments**
  - Planned setups, material and labor shortages, warmup time

- **Small Stops**
  - Jams, misfeeds, sensor block, flow obstructed, cleanup

- **Reduced Speed**
  - Rough running, employee inefficiency, equipment wear

- **Startup Rejects**
  - Scrap, rework, incorrect assembly

- **Production Rejects**
  - Scrap, rework, incorrect assembly