Caterpillar’s Seguin facility, is a 1.2 million square foot diesel engine assembly plant. Currently tugger drivers transport carts carrying material from the sequencing area to the assembly line. Caterpillar has plans to implement industry 4.0 technology by employing Autonomous Mobile Robots (AMR) seen in Figure 1 to transport parts. The first step in implementation is ensuring the floor plans can accommodate the AMR’s.

Currently starter motors and turbochargers are transported to the assembly line together

OTTO 100 needs docks (designated areas with smaller tolerances) to set up to pick up and drop off carts.

**Proposed Layout**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Attribute weight</th>
<th>Floor Plan 1</th>
<th>Floor Plan 2</th>
<th>Floor Plan 3</th>
<th>Final Floor Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost to Implement</td>
<td>3</td>
<td>5</td>
<td>15</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Time to Implement</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>2</td>
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<tr>
<td>% Change from Original Layout</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Safety</td>
<td>5</td>
<td>3</td>
<td>15</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Effect on Sequencer</td>
<td>4</td>
<td>4</td>
<td>16</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Effect on Tugger Driver</td>
<td>4</td>
<td>4</td>
<td>16</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Compatibility with OTTO</td>
<td>4</td>
<td>4</td>
<td>16</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Overall Rating</td>
<td>89</td>
<td>91</td>
<td>72</td>
<td>95</td>
<td></td>
</tr>
</tbody>
</table>

**Background Information**

Caterpillar Sequence Part Transfer Optimization and Automation

Riley Horner, Alejandra Flores Sifuentes, Ryan Morris
Roy Stanley, Sebastian Maliyakal Francis

**Future Work**

- Create simulation showing the change in work flow with OTTO
- Define expansion zones and changes needed to convert to OTTO 100 carts
- Things to be considered for expansion area
  - OTTO Path determined by Caterpillar
  - Material that can be carried by new carts

**Conclusion**

- Optimizing the starter motor sequencing area with the current carts:
  - Allows the sequence workers to adjust their work flow decreasing the variables when implementing the AMR’s.
  - Will help find potential downsfalls in the new layout that can be adjusted before the AMR’s are implemented .
  - Will help create a business plan for adjusting all other sequencing and assembly areas

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