Assumptions:

- Material handlers move product between process cells through aisles in the line designs.
- Circuit board assembly defects are found before being processed and then scrapped.
- Wire Harness Average rework time: .90(160) + .10(300) = 174 s → 174 s - 160 s = 14 s
- Effective Cycle time is the actual station cycle time divided by the number of operators

Station	Current State						Future State					
	F	S	Q	H	E	R	F	S	Q	H	E	R
1	2.9	1.333	840	450	100%	85%	2.8	1.333	840	450	100%	90%
2	6.8	2.900	840	450	100%	80%	6.0	2.900	840	450	100%	90%
3	0.7	0.267	840	450	85%	80%	0.6	0.267	840	450	95%	90%
4	3.9	1.667	840	450	100%	80%	3.5	1.667	840	450	100%	90%
5	0.9	0.367	840	450	94%	80%	0.8	0.367	840	450	97%	90%

Summary:

In our strategy to address MAE's desire to improve their lead time, we chose a few areas to focus on. We decided to focus on reducing the amount of inventory in between stations, increasing uptime, reducing defects, redesigning the line, setting the pacemaker to Circuit Board Assembly, and setting the frequency of shipments of frames and housings to twice weekly. Reducing inventory between stations improves the lead time by reducing the time spent in queue and improving continuous flow. Increasing uptime for all stations improves lead time by increasing the time that the line is operable. Reducing defects improves lead time by reducing the number of times a part has to be either reworked or scrapped, which allows parts to move through the line faster and improves continuous flow. Redesigning the line improves lead time by improving the overall flow of parts and decreasing wasted motion of the operators. Setting the pacemaker to Circuit Board Assembly improves lead time by utilizing the balance of the effective cycle times to support continuous flow. Setting the frequency of shipments of frames and housings twice weekly improves lead time by allowing us to maintain lower levels of inventory before Circuit Board Assembly.

The current state line design described was a process layout which was represented in four sections: Circuit Board Assembly, Wire Harness Assembly, Testing, and Housing Assembly. The future state line was redesigned into two separate manufacturing cells to reduce the walking distance and make the flow of products shorter and simpler. This design also increased the area of operation for the shipping and receiving departments.

The kaizen event plan and target sheet were directed to the effort of reducing inventory within the assembly line as we decided this was critical in reducing the leadtime to 8 days.

The operator balance chart was developed such that the effective cycle time depicts the processing time with the number of operators factored in, whereas the actual cycle time depicts the true imbalance of the current and future state system. There is no clear improvement between the current and future states with regards to balance because our strategy was focused on inventory.