MMLD Final Project
Exercise 7
Resource Calculations

You now have all the data to calculate *resources per process*. The general formula is this:

Resources = Standard Time (Weighted) / Takt

For example: a product requires six minutes of labor (STw), and has a takt time of two minutes. Thus, the line will need three people working. Or, restated: each unit takes six minutes of work, but we need one unit every two minutes, so we'll need three people to keep up. This formula applies to machine processes in the same way.

Task 1: Enter the formula above in all the process cells along the row titled "Required Resources". Then, review the data calculated, and display to 2 decimal places.

Interpreting the calculated resource requirements. Now, look at each process column's result, keeping in mind that some processes involve both labor and material resources. The *following examples* will guide you. (The numbers are illustrations; your actual results may vary!)

- **Final Assy: 8.3 labor resources; no machinery**. Leave at fractional number for people, but round up to provide 9 workspaces (here, probably assembly benches). So, 9 "Locations".
- **E-Test: 0.89 labor; 0.89 machines.** Round up to 1.0 machine (can't have a fraction of a machine); operator will work most of the time at that machine, so just 1 "Location".
- **Mold: 0.19 labor; 0.65 machine**. Round up to 1.0 machine; operator will work at that machine, and have time to flex to a related process. Hint: what nearby process might that operator flex to? 1 Location for Mold.

Task 2: Complete Resource Calculation Spreadsheet which you will use in Conceptual Line Design Exercise 9. On the left side of the Spreadsheet, find row titled "Locations". Based on your analyses as illustrated above, determine the number of locations required for *each process* (some of which include both labor and machine. Enter that number for each process.
Then, in leftmost cell of row titled "Total Labor Resources", build a formula to sum all the required labor resources across the spreadsheet, and round the sum to 1 decimal place.
Finally, in leftmost cell of row titled "Total Locations", sum all the required locations, or footprints.
Save all your work on the Resource Calculation Spreadsheet, which will be a key source document for creating your Conceptual Line Design in Exercise #9!

Formula	Comments
People = STw_{LABOR} / Takt	Leave the result fractional and round up for the entire line or based on feeder grouping and ability to flex.
Workstations = STw_{LABOR} / Takt	Same formula as above, but usually round up per process.
Machines = $STw_{MACHINE}$ / Takt	This formula applies to machines that run one piece at a time. Usually round up in the process. ST is from piece to piece.
Pieces = $STw_{MACHINE}$ / Takt	Applies to multi-spindle or batch machines. Calculates required capacity in units per machine batch – as test tubes in a centrifuge – to achieve Takt.

Resource Calculation Worksheet

Part #	Description	Daily VOL	Mold		Grind		Motor	Wiring	E Test		Mandrel	Final	Test		Pack	
			L	M	L	M	L	L	L	M	L	L	L	M	L	M
DR12	**Drill**	56.0	0.5	1.3			2.9	4.2	1.3	1.3		3.3	1.5	3.2	2.2	0.9
DR54	**Drill**	84.0	0.5	1.3			2.3	4.5	1.3	1.3		12.2	1.5	6.5	2.3	0.9
DR11	**Drill**	65.0	0.5	1.3			2.7	5.3	1.3	1.3		4.1	1.5	3.3	2.5	0.8
SD04	**Sander**	3.2	0.5	2.2	2.1	2.1	3.6	4.6	1.3	1.3		3.5	1.5	3.4	3.1	0.8
CS87	**Circular Saw**	64.0									2.8	10.5	1.5	5.9	2.1	0.8
OS31	**Orbital Sander**	76.0	0.5	3.2	2.7	2.7		4.6	1.3	1.3		4.5	1.5	3.1	2.5	0.8
OS01	**Orbital Sander**	8.0	0.5	2.2	2.7	2.7		4.5	1.3	1.3		4.2	1.5	3.3	2.4	0.9
CH96	**Chain Saw**	54.0									2.8	11.3	1.5	6.2	2.3	0.8
CH09	**Chain Saw**	46.0									2.8	9.8	1.5	6.6	3.2	0.9
		456.2														
Process Throughput																
Effective Minutes																
Takt Time																
Sum Product																
Weighted Standard Minutes																
Required Resources																
Locations																
Total Labor Resources																
Total Locations																