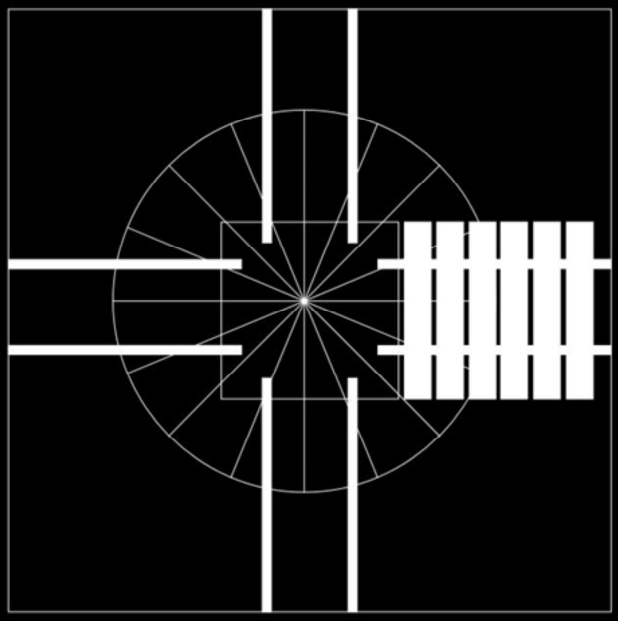
BEFORE

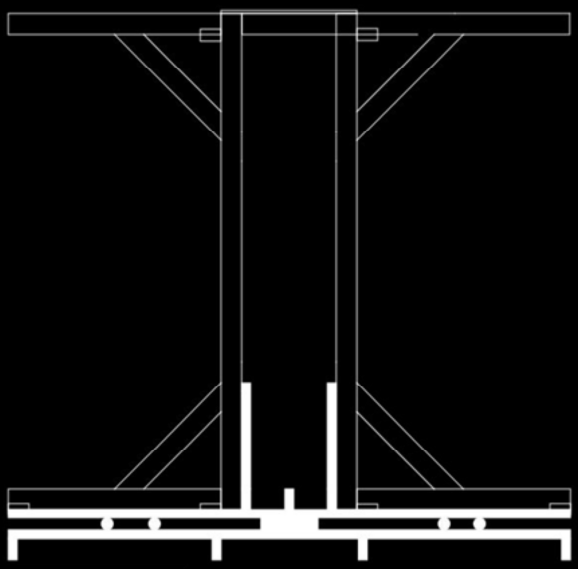
I was laid off in August of 2019 and was unemployed for 9 months. To make ends meet I took up a temporary manufacturing efficiency consultant job with a company in West Columbia South Carolina that was embarking on their ‘lean’ journey. I teamed up with another consultant to help consult them through the adoption of lean thinking principles to help them improve their business operations results.

For me one thing that I noticed quite quickly in their operations that it was very labor intensive and the assembly process was fraught with ergonomic inefficiencies. I knew that if I could improve the ergonomics I could improve the capacity, capability, available, flexibility reliability and overall efficiency of the process lead time.

Here we see another huge ergonomics issue with the operator of the attic stair door jamb assembly having bend over stoop down and pick up the jamb from up off the floor. Doing this several hundred times a day was putting stress on the operator and causing fatigue.

My answer to this problem was to design and build my own carousel to ‘hang’ the jambs on after they had been built at the jamb assembly work station in readiness to be picked up by the jamb installation operator for installation to the attic ladder door assembly work station.





1. X 16, 2 X 4 X 1.5	- 36" CUT 45°	TOP AND BOTTOM OUT RIGGERS	
2. X 08, 2 x 4 x 1.5	- 84" CUT 90°	VERTICAL SUPPORT BEAMS	
3. X 16, 2 X 4 X 1.5	- 25" CUT 45°	COUNTER BALANCE ARMS	
4. X 04, 2 X 4 X 1.5	- 96" CUT 90°	FLOOR SKIDS	
5. X 08, 2 X 4 X 1.5	- 08" CUT 90°	OUT RIGGER END STOPS	
6. X 01, 25" X 25" X ¾"	-	TOP JOINING PLATE	- PLYWOOD
7. X 01, 95" X 95" X ¾"	-	BASE JOINING PLATE	- PLYWOOD
8. X 01, 95" X 95" X ¾"	-	BOTTOM JOINING PLATE	- PLYWOOD

TOTAL 2 X 4 X 1.5 LENGTH 2,032 INCHES OR 170 FEET

This is my design which as I mentioned in a previous post this company had an over abundance of wood to choose from, essentially this was like a lumber yard. So, I designed and built the porotype from 2 X 4 pallet timber wood with the idea that if it worked out I would then design it out of steel and have it made by a fabrication shop. Four would be needed for each of the four folding attic stairs ladder production lines.

This slide shows my drafted design he following slides show the progressive steps in my design, construction and assembly of the carousel design.

Actually, the first thing that I did was to build a model of my design at ¼ scale. I demonstrated my concept and how it would be used line side to the operators of the production line, supervisors and management to get their buy-in and approval to go full scale.

Construction.

Construction.

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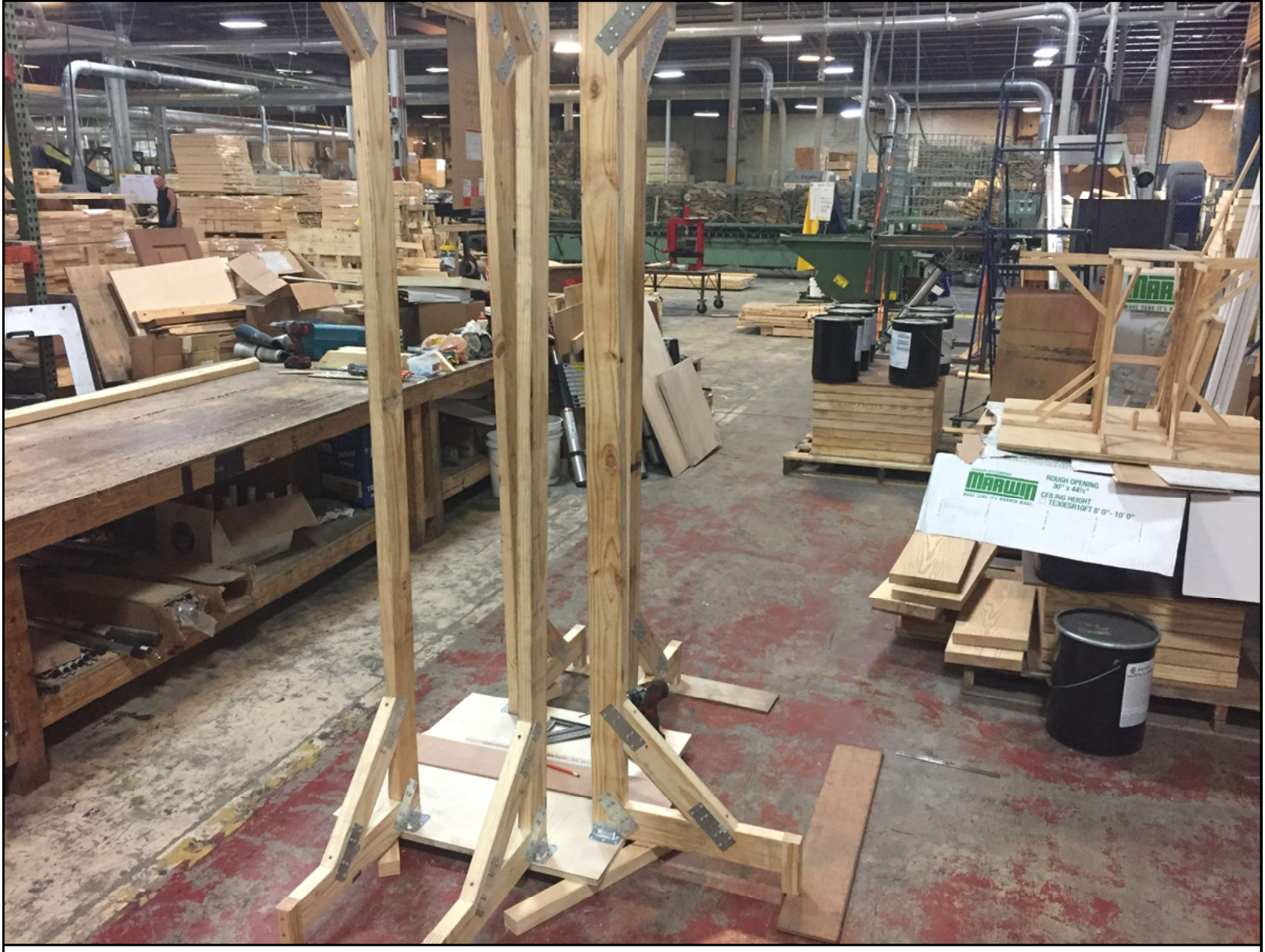
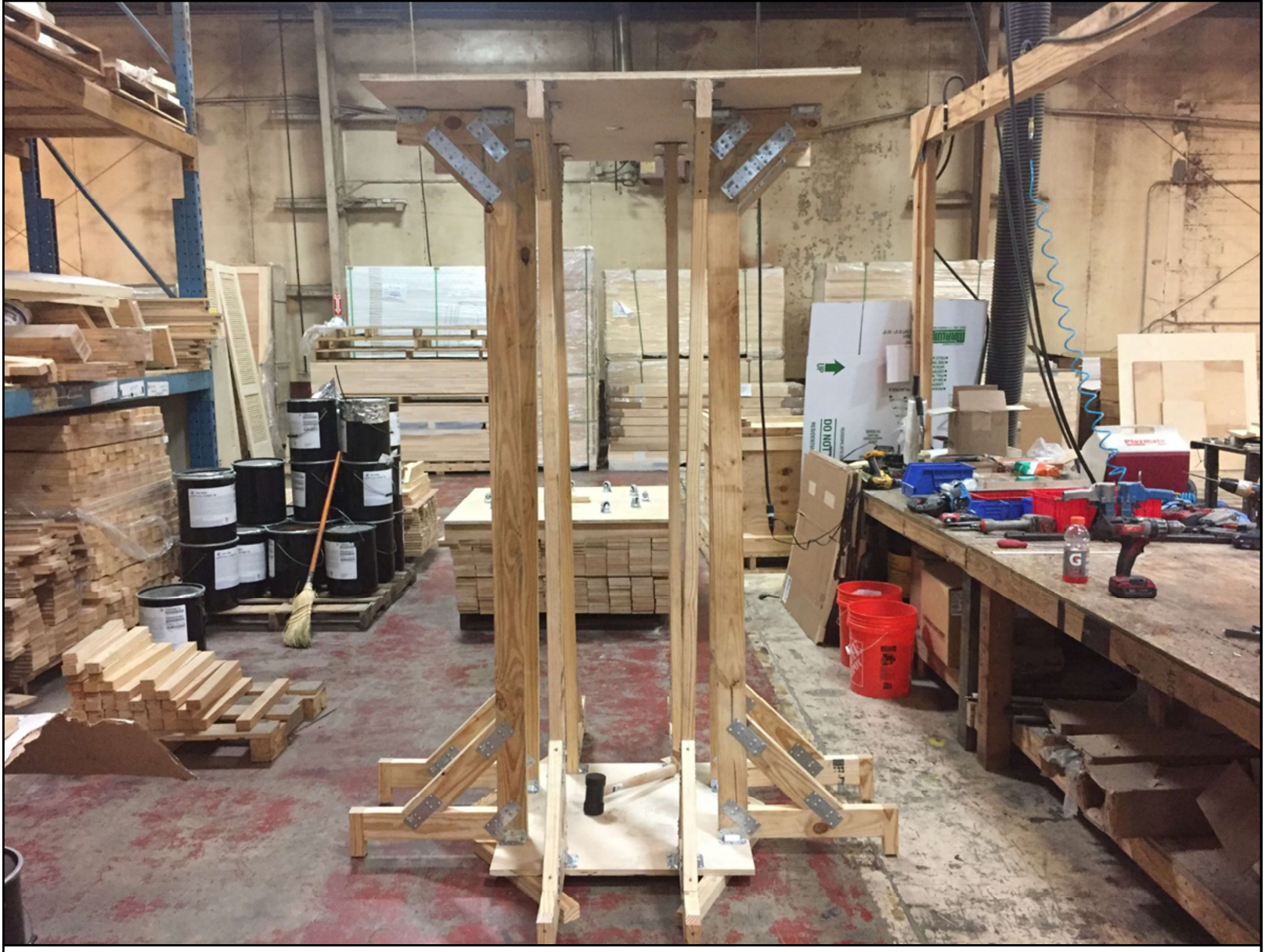


Construction.



Construction.

Construction. The roundtable part of the carousel was made by using inline 18 caster wheels aligned in a circle and then the roundtable was installed held center by a 3” diameter dowel rod affixed to the center of the base.

Construction complete! Now move it to the production line.

Line side installation.

AFTER

In use. No more bending down and stooping to pick up the jamb from the floor anymore. Now that it works, the problem of designing it out of steel. Making it from steel I would used a much less balking material than 2” X 4” wood and would have used 1/16” gauge steel tubing.