

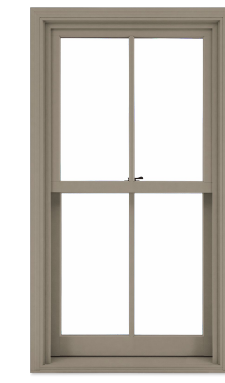
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## Background

Marvin Windows and Doors is located in Roanoke, Virginia and produces Double Hung and Casement Windows. The Window Fabrication Department kits windows for production.



Double Hung (DH)

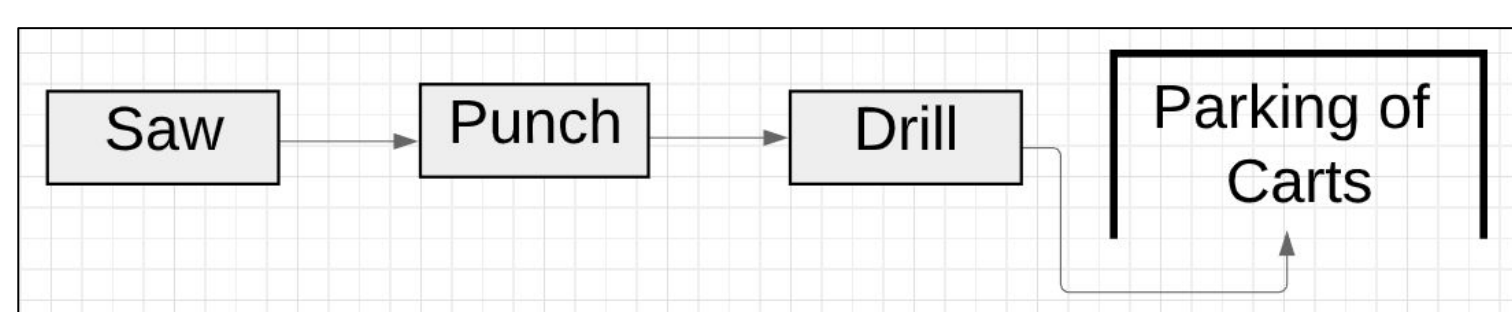


Casement (CA)

## Problem

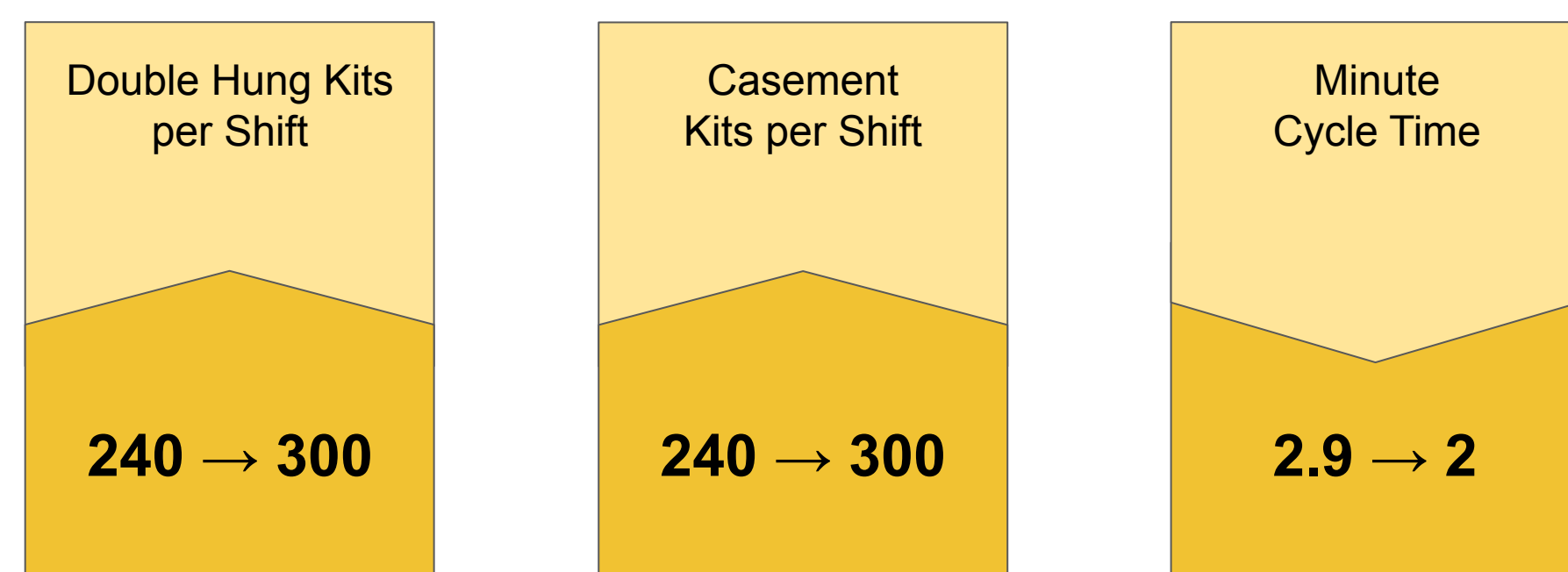
The Window Fabrication Department is currently unable to meet the increasing demand set by the three production lines, and are missing opportunities to sell the demanded units of windows.

Marvin has no up to date time studies or model of the Window Fabrication department that they can use for capacity planning.

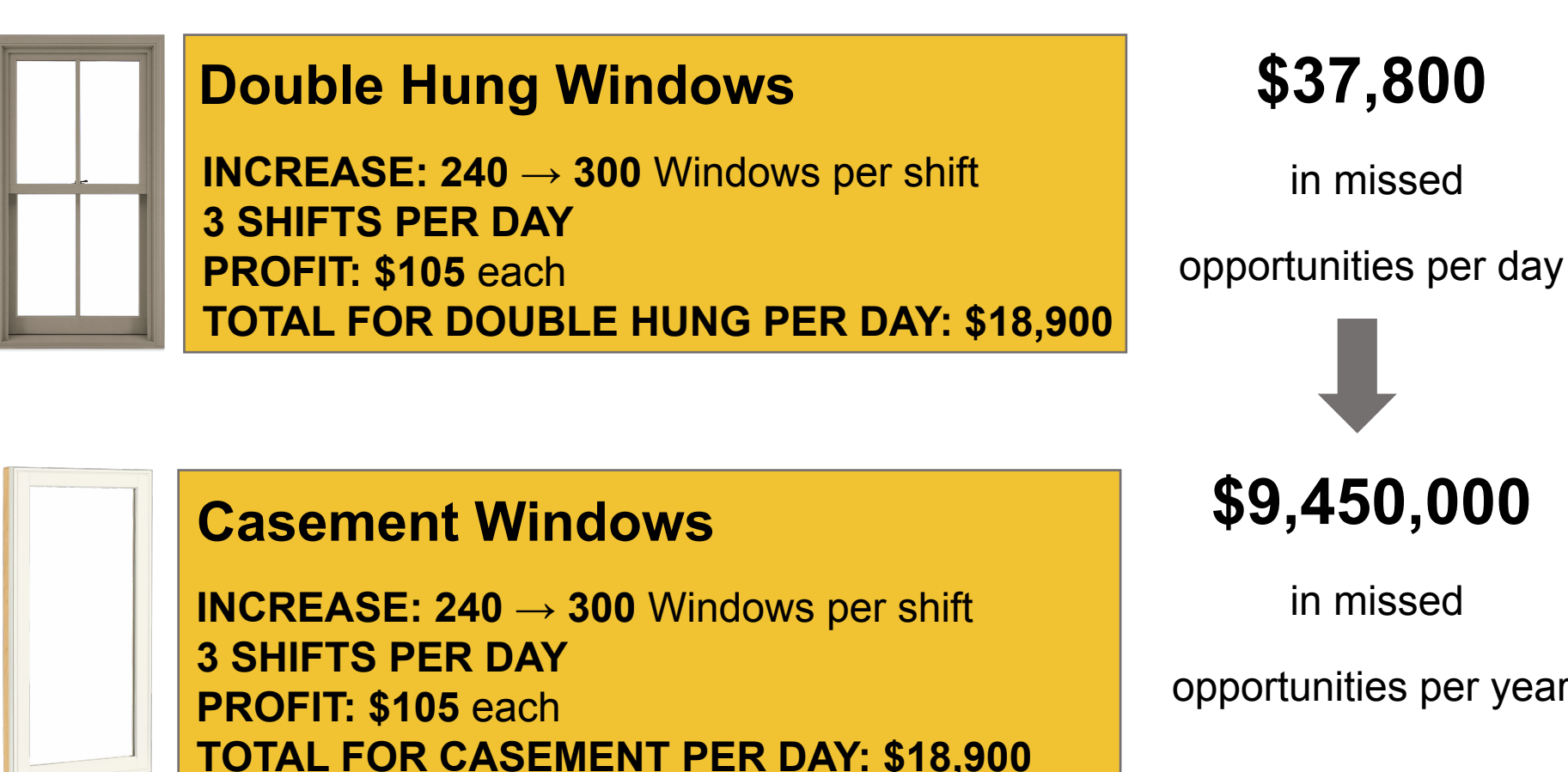


Example of flow in the Window Fabrication Department, not every piece is cut with the saw, punched, or drilled.

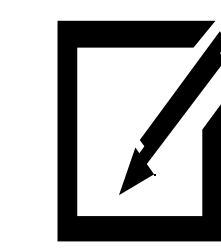
## Objectives



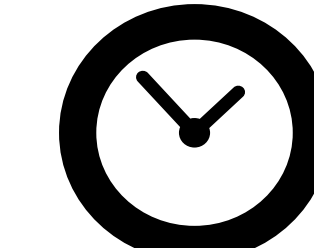
## Business Impact



## Solution Approach



Observe and Document



Time Studies

## Process Maps

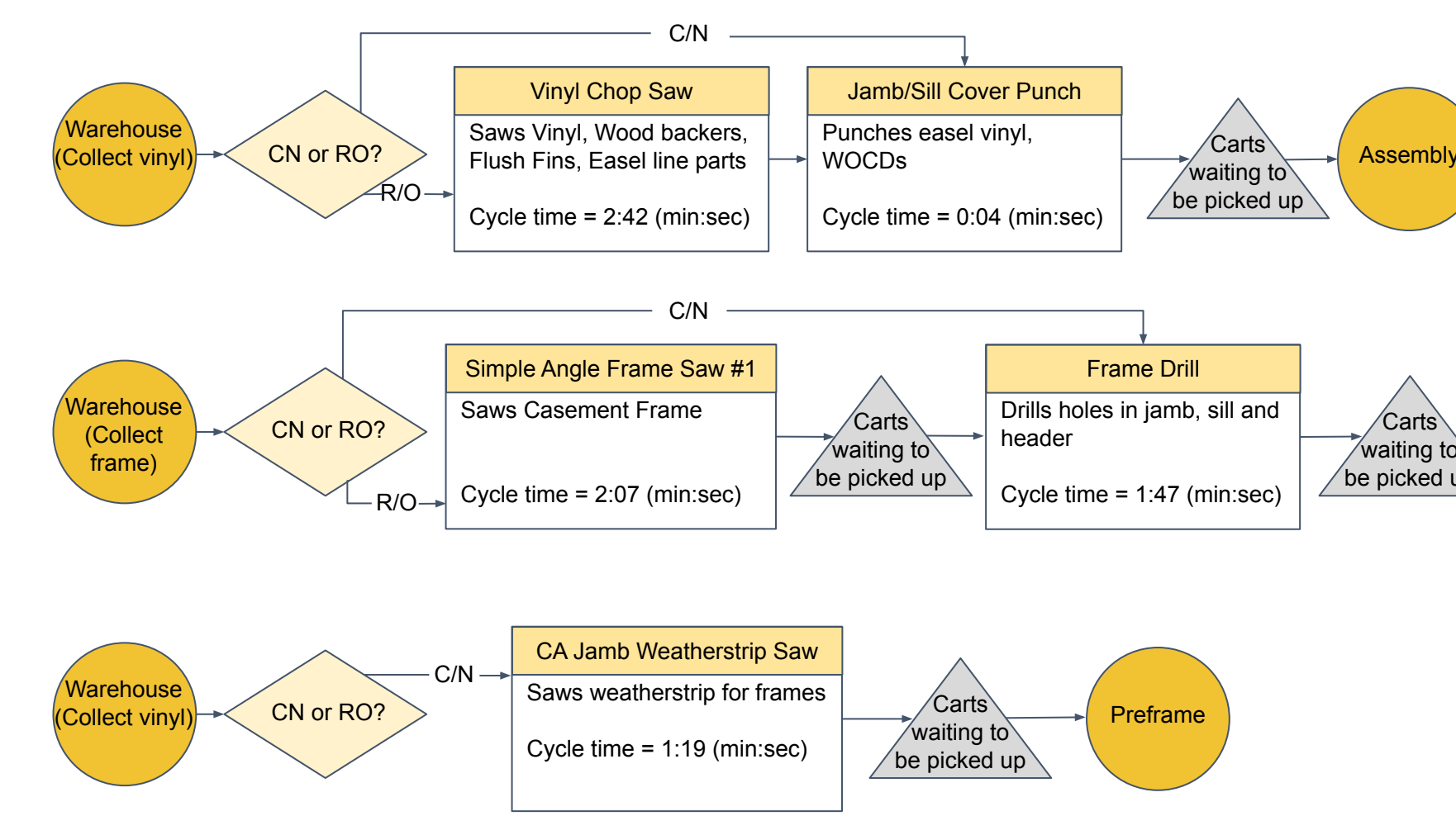


Figure 1. Fabrication feeding ES 1 - Casement Only

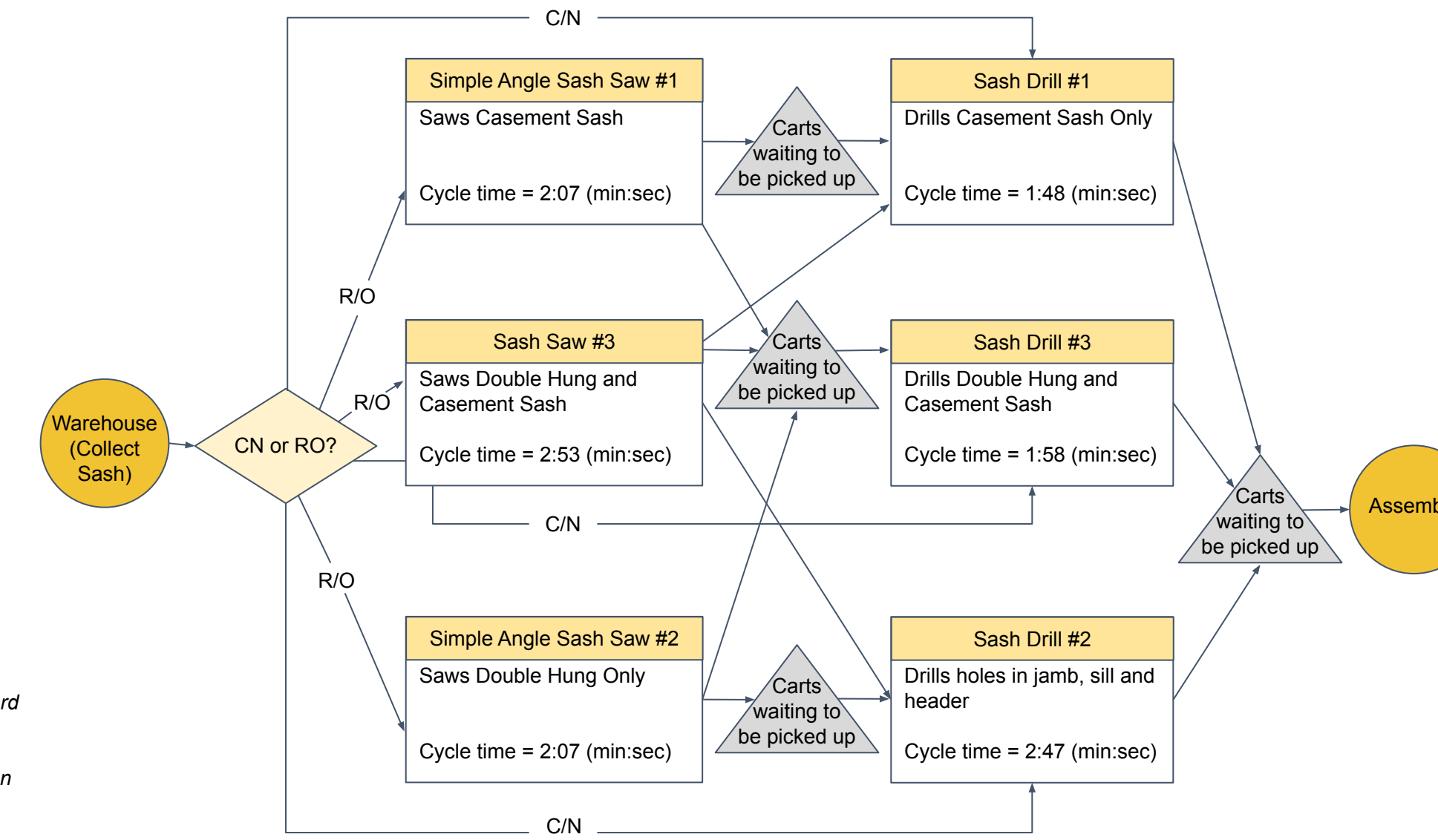
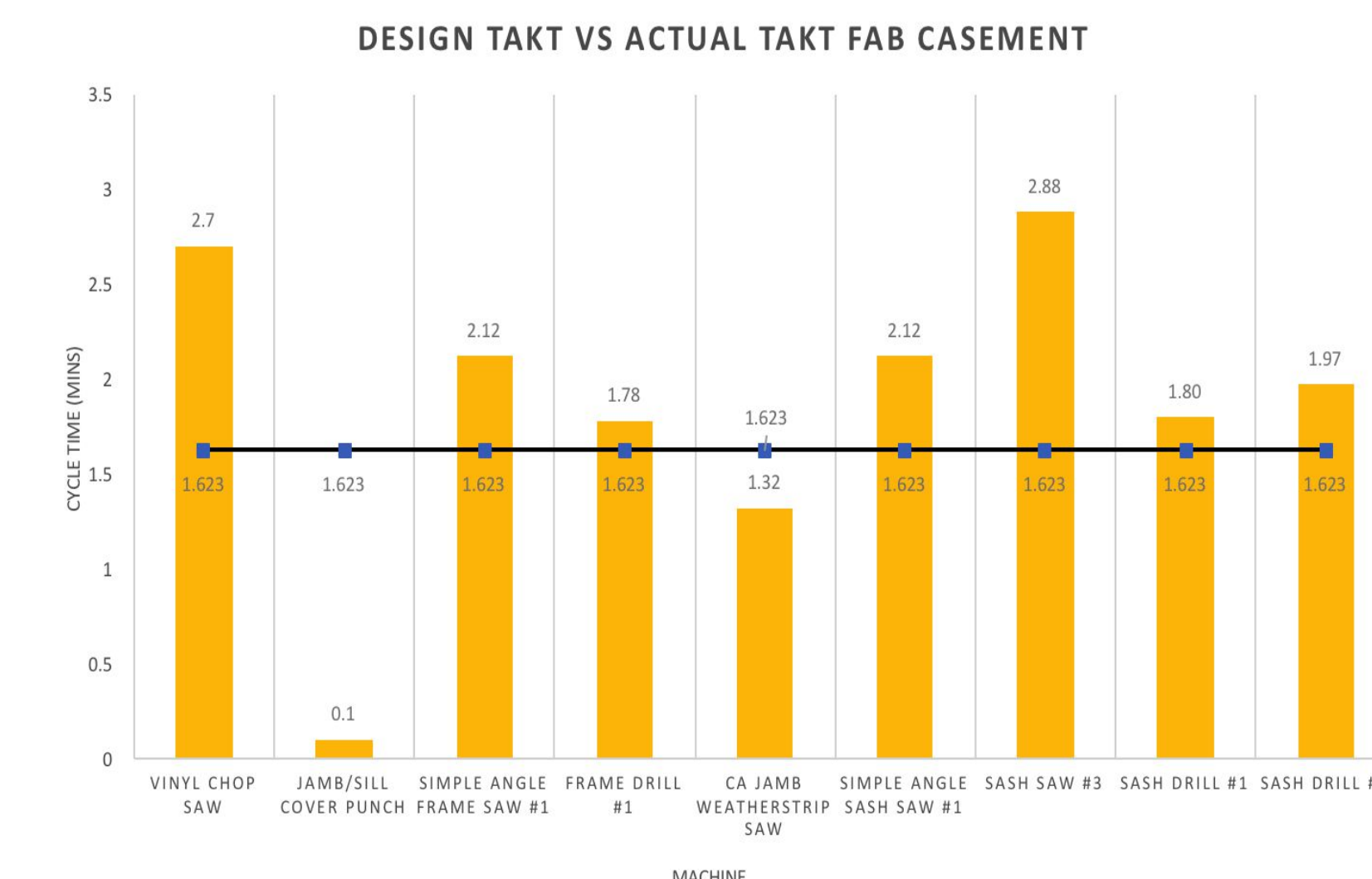
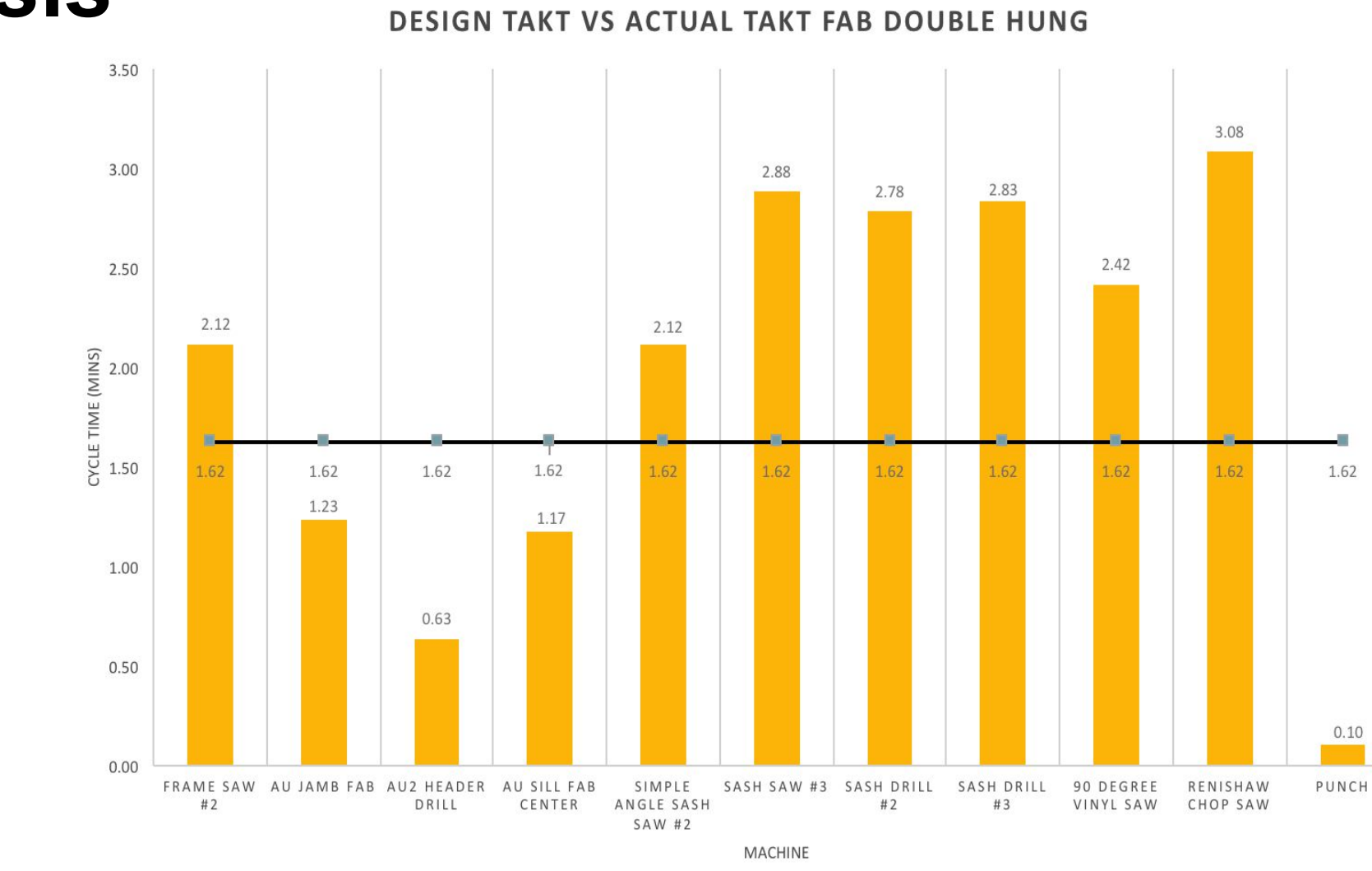


Figure 2. Fabrication for Sash for CA and DH

## Data Analysis



Graph 1. Design Takt vs Actual Takt Fab Casement



Graph 2. Design Takt vs Actual Takt Fab Double Hung

## Simulation Model

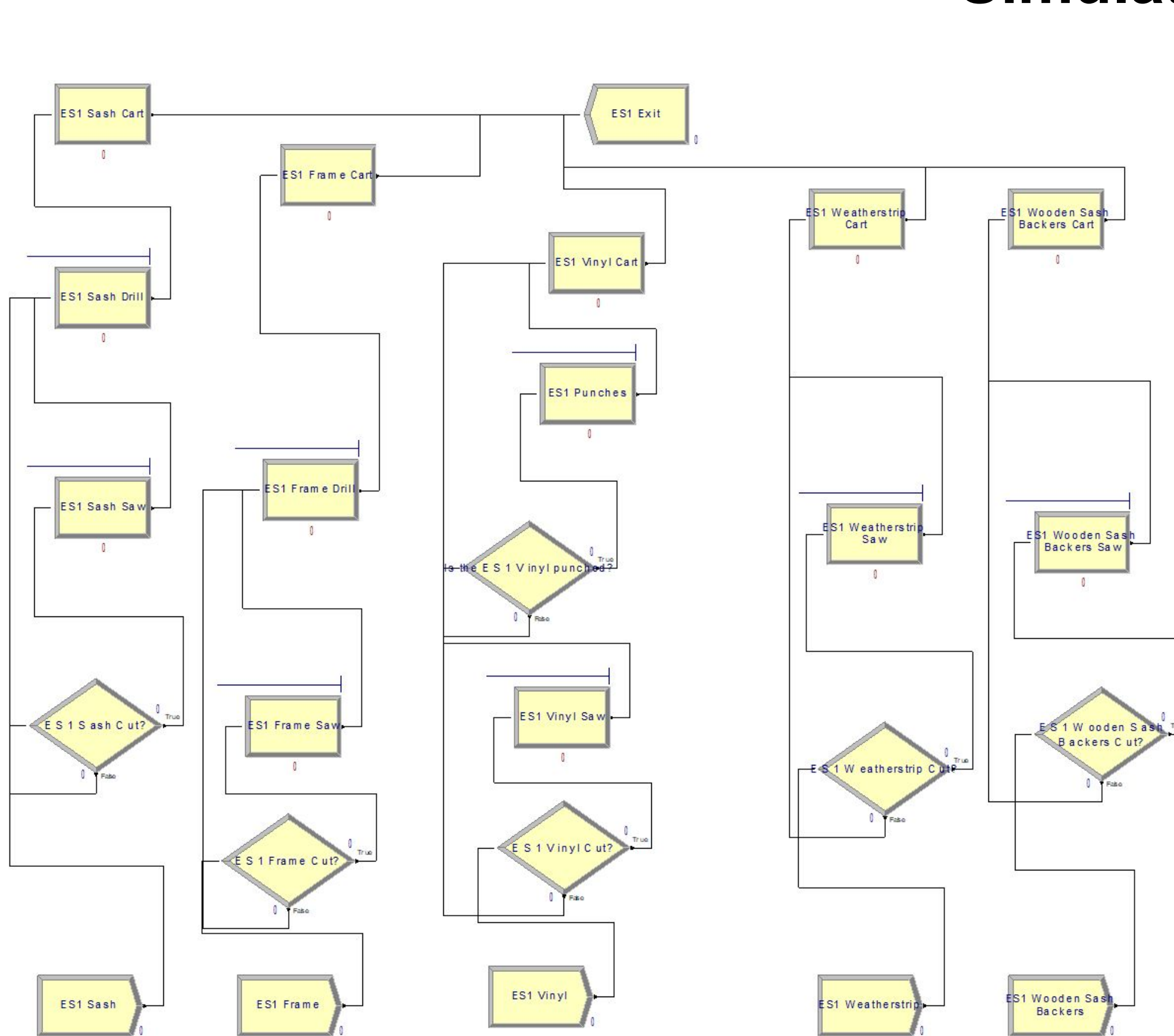


Figure 3. Model of Casement Flow of Kits to ES-1.

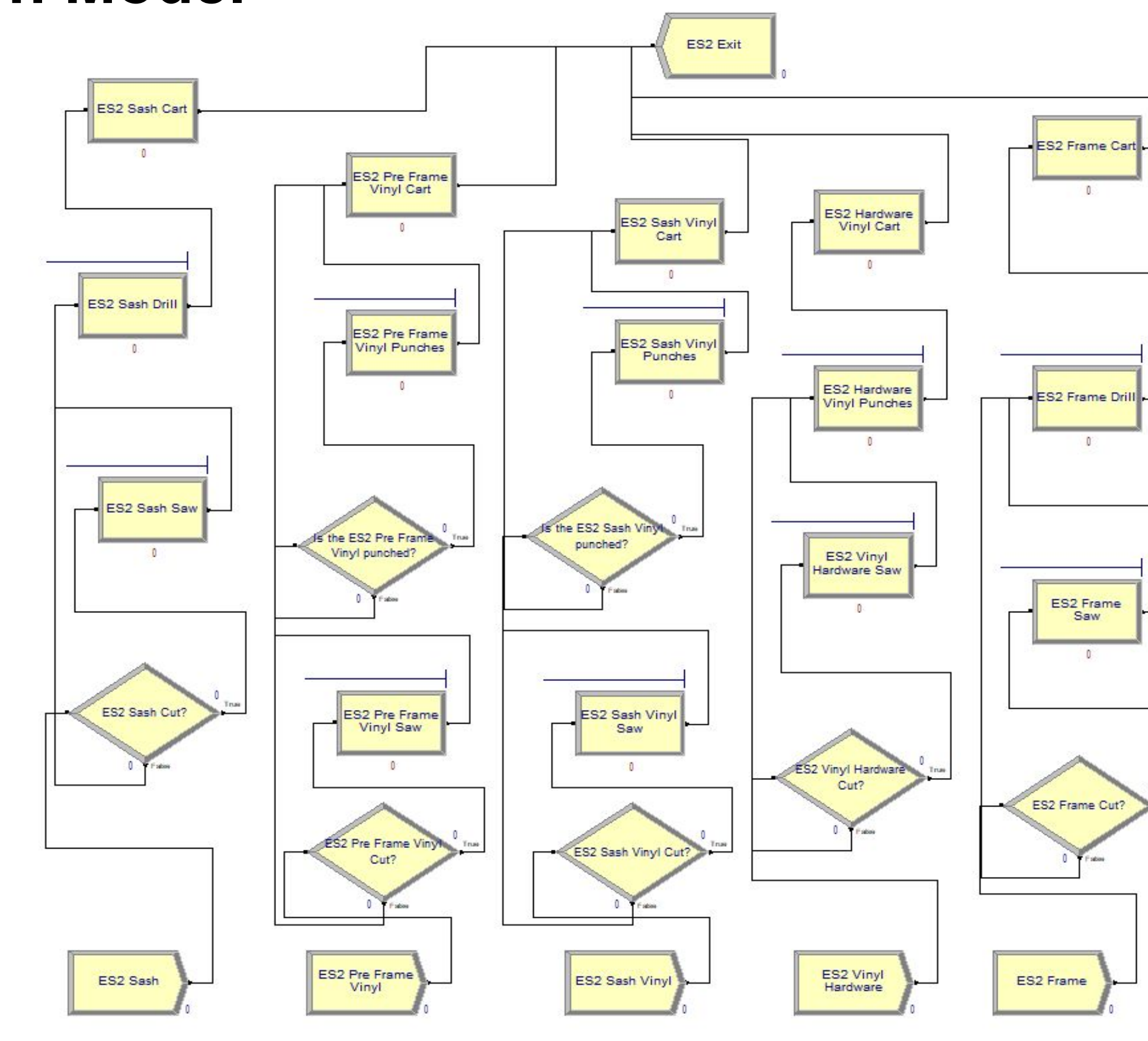
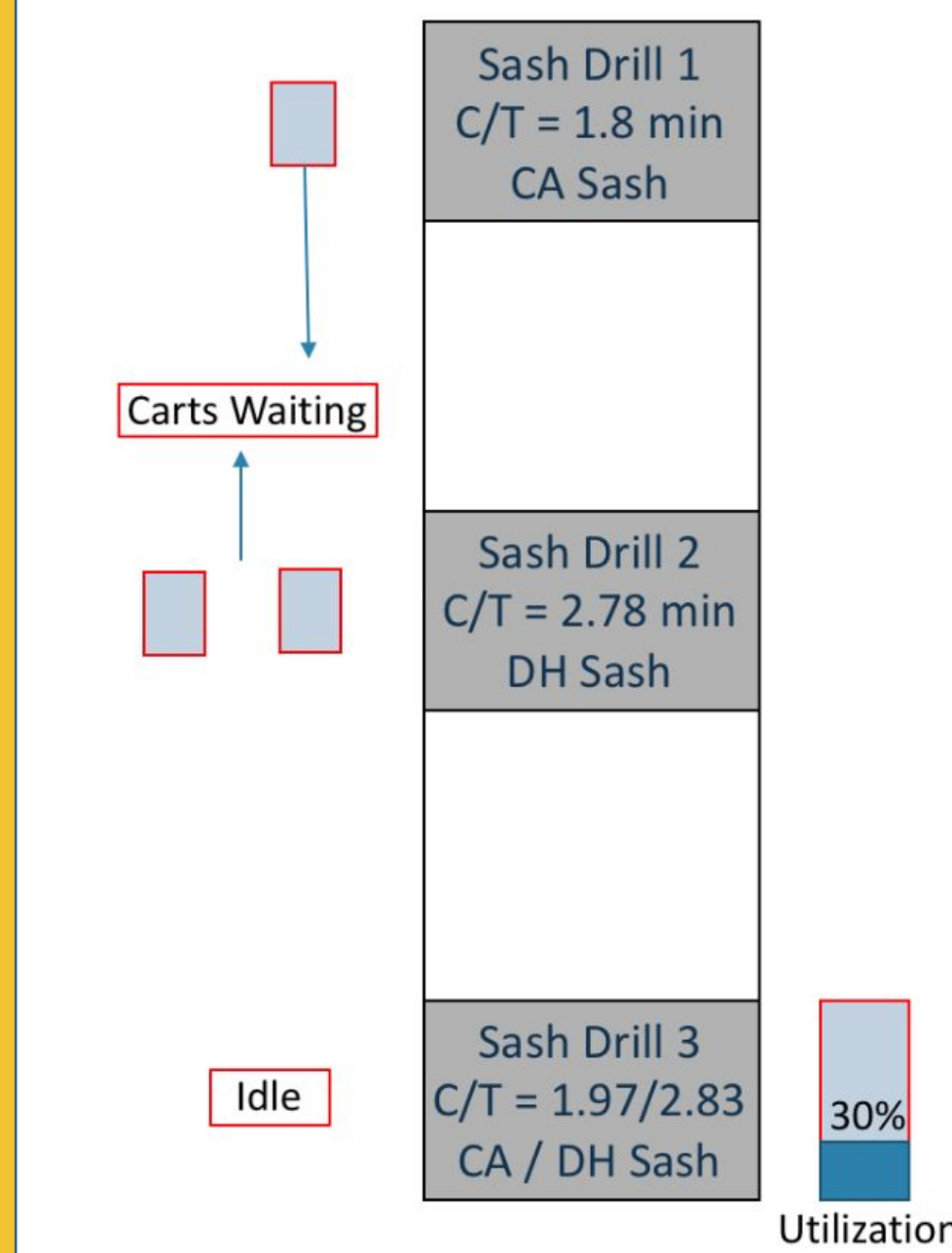


Figure 4. Model of Double Hung Flow of Kits to ES-2.

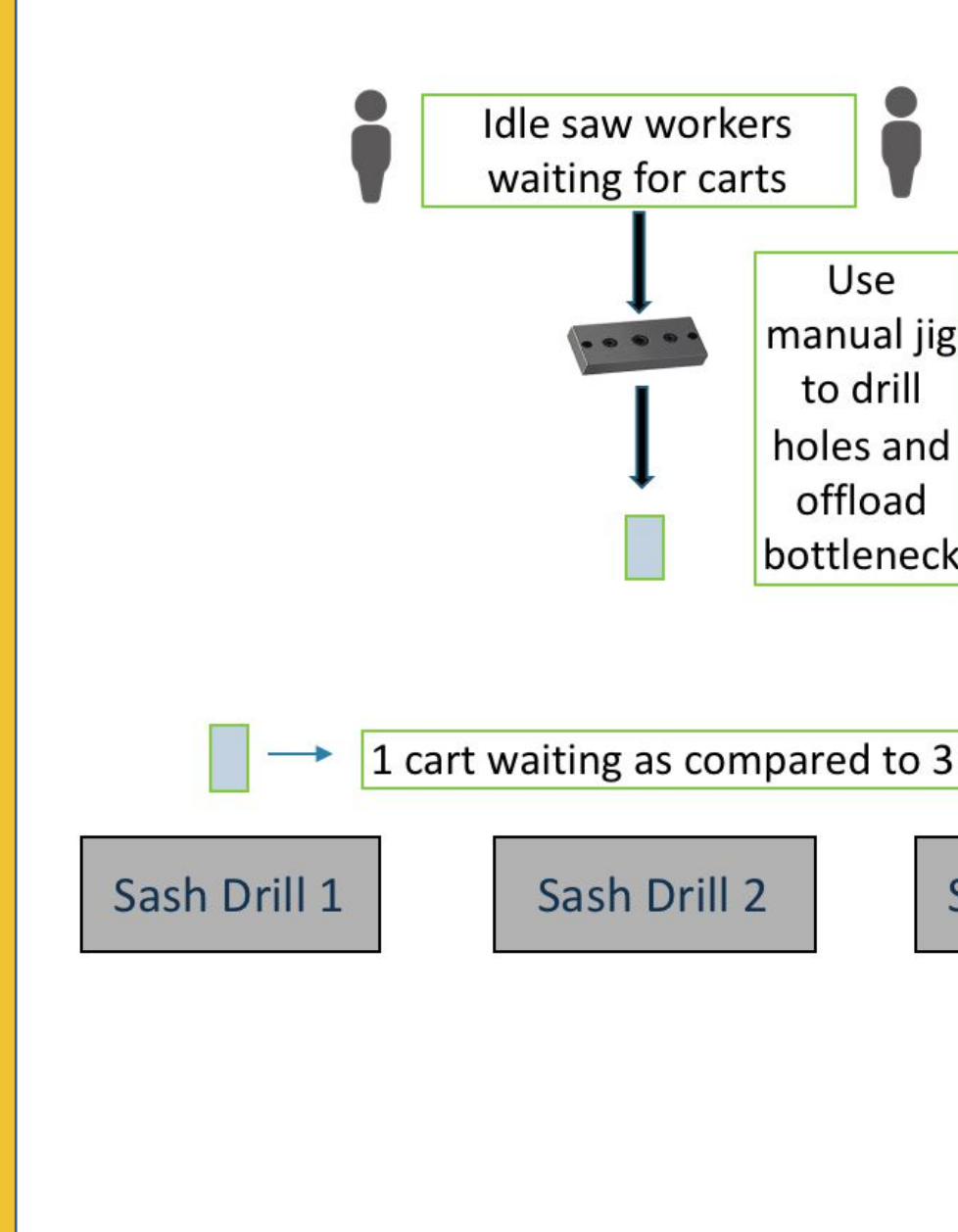
## Results

### Opportunity #1 Current State



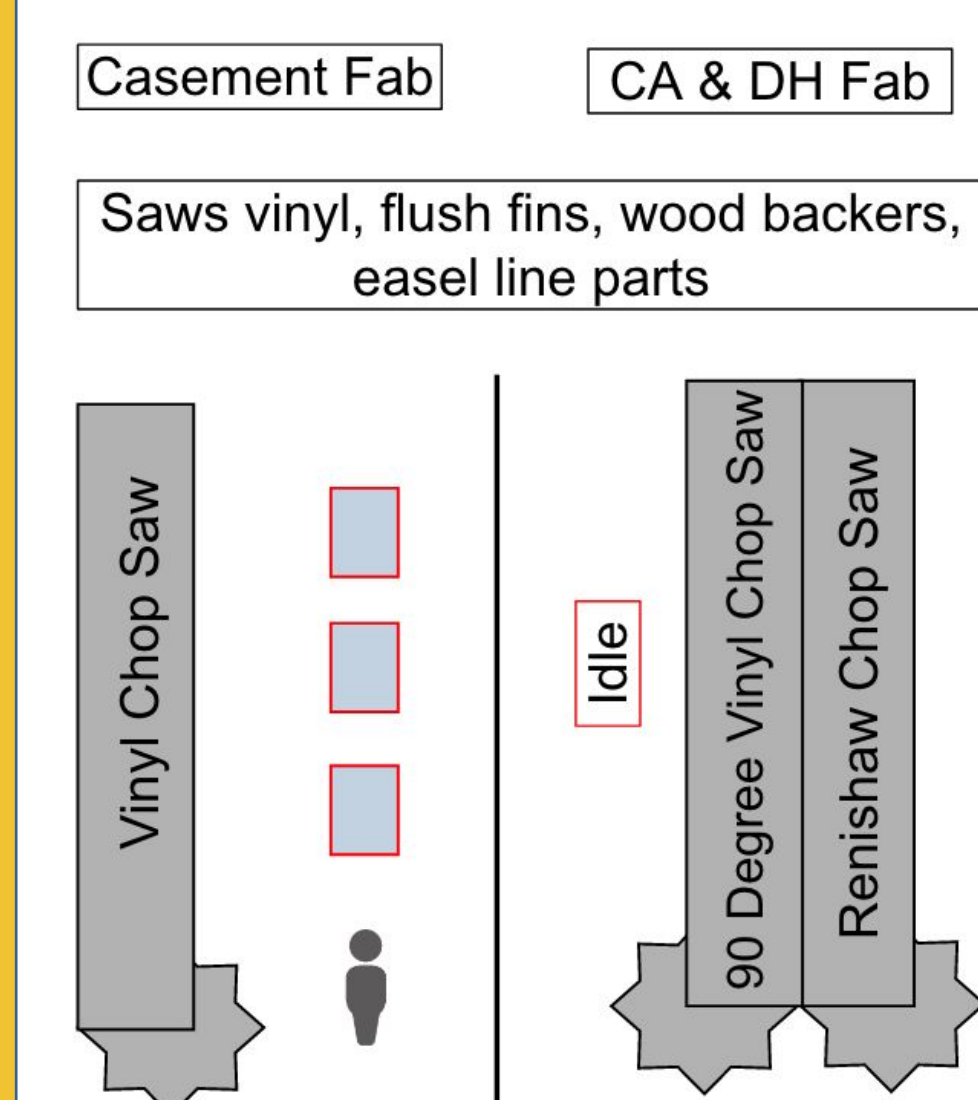
- Sash Drill #1, #2 and #3 are above the design takt time of 1.62 minutes and thus critical bottlenecks.
- Carts waiting on Sash Drill #1 and #2 while Sash Drill #3 is sitting idle.
- Sash Drill #3 is only ~30% utilized, since few operators are cross trained to use it.

### Opportunity #1 Future State



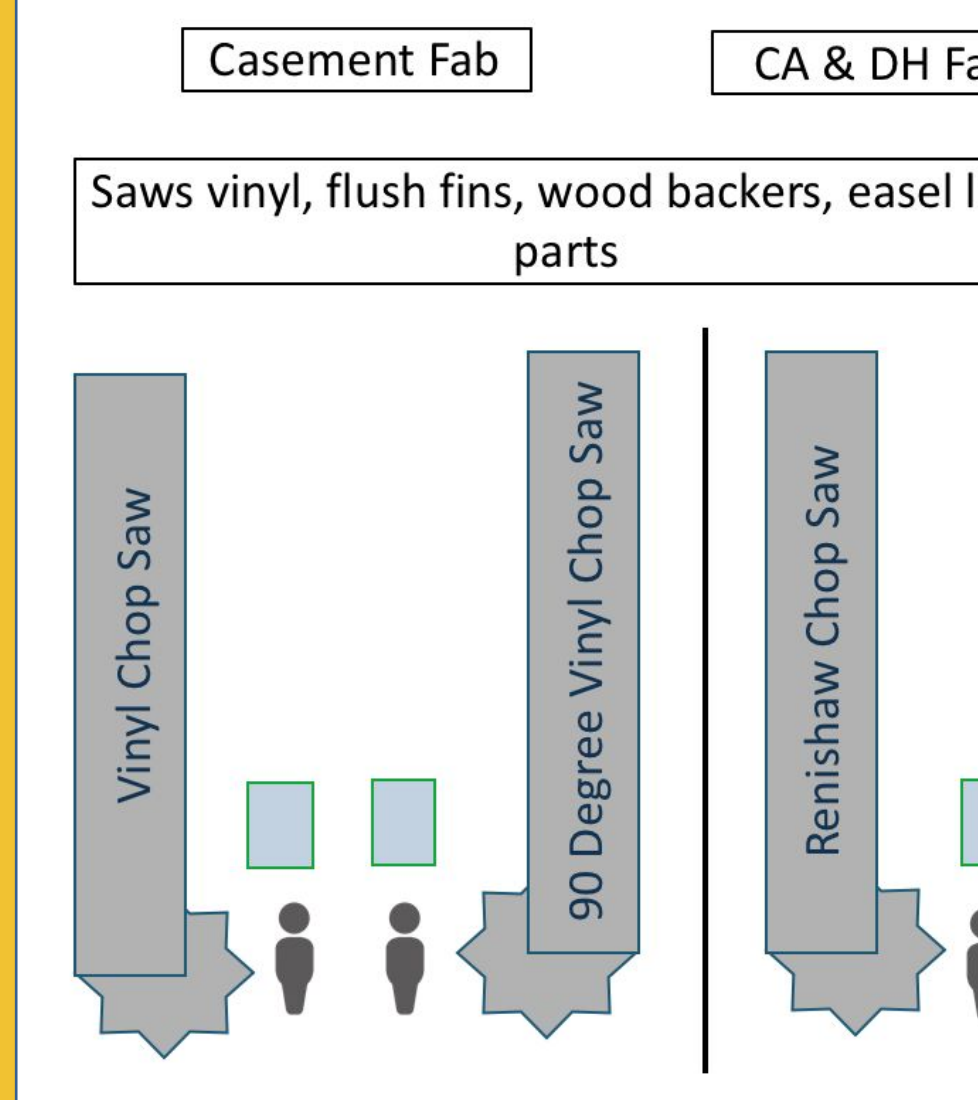
- Cross train workers to efficiently operate Sash Drill #3 and increase its utilization to a minimum of 85%.
- Idle saw workers can use a jig to manually drill holes in Sash and offload the bottleneck, instead of adding into WIP.
- This will decrease the lead time of parts and increase throughput through the Sash Drills by load balancing.

### Opportunity #2 Current State



- During peak season, the Vinyl Chop Saw in Casement Fab is often lined up with 3-5 carts to be processed.
- Vinyl Chop Saw processes multiple parts and thus often blocked with carts waiting.
- Casement Fabrication workers often request another Vinyl Chop Saw.

### Opportunity #2 Future State



- Use the 90 Degree Vinyl Chop Saw and Renishaw Chop Saw to process carts waiting on the Vinyl Chop Saw.
- Provide software updates to both of the saws in CA and DH Fab to display CA batch numbers.
- Offloading the bottleneck and load balancing will increase the throughput of the Vinyl Chop Saws and reduce the waiting time for carts.