ENGR 1181 | Engineering in Humanitarian Relief Lab

- Executive Summary
- Team _____N_____

Accountability Acknowledgement:

I declare and acknowledge that I have offered a significant contribution to this team writing assignment and that the work I have submitted to the group is my own.

Name (typed)	Role	Signature	Date
Nick Schwalm	Process Mapper	Nicholas Schwalm	10/17/23
Joey Silvaggio	Process Mapper	Joseph Silvaggio	10/17/23
Justin Lewis	Layout Planner	Justin Lewis	10/17/23

From: Group Letter – Nick Schwalm, Joey Silvaggio, Justin Lewis Humanitarian Relief Lab
To: Site Manager 10/19/23

Executive Summary

Background and Purpose:

The purpose of this lab was to design a process map that could improve the unloading process by decreasing the amount of time unloading takes and to design a warehouse layout that is the most efficient for organizing relief supplies. This is all an attempt to provide recommendations to our supply chain company to provide the best possible humanitarian relief efforts to the victims of the 7.0 magnitude earthquake in Tukastan.

Results & Analysis- Operations Manager & Process Mapper Content:

Our team's approach when developing the process map was to reference the example process map. We also took into consideration the time constraints for completing the task, the minimum number of people it takes to complete the task, and the total time it takes to complete the task. The biggest challenge we faced was navigating the software because it was our first time using the software. The role the process map played when considering recommendations was if the process map helped us to judge whether the process was efficient or not. Our floor plan was three sections: first section was person 1, the second section was person 2, and the last section was the time it takes to complete the task. For when multiple people are working on the task the bubbles are in between person 1 and person 2. Each bubble represented either the task being worked on or the minute amount it takes to complete the task. The recommendation we came up with to decrease the total time was instead of having people work on separate tasks individually for the tasks that currently only require 1 person to complete, we believed that if two people worked on the same task then it would get done twice as fast. Another recommendation that can be made is that instead of completing one task at a time, to instead do it all at once. For example, the transfer of ULD content to storage pallets is currently done 1 ULD at a time, we recommend that if two people transfer the ULD contents to storage pallets all at once, this could decrease the total time drastically. These improvements can be shown to work based on the time needed to complete each task. The current process map takes 86 minutes to complete, the goal is to reduce that time to under 70 minutes. If the recommendation that two people complete the tasks that currently only require one person, the time for each task can be cut in half. This could reduce the overall time of 86 minutes by 24 minutes, bringing it down to a total time of 62 minutes. We were able to calculate this time using an excel spreadsheet attached in the appendix below. In order to calculate the times, we divided the original time for each task and then multiplied that by the number of tasks. This

was done to the tasks that were originally done by 1 person but were recommended to be done by two people.

Results & Analysis- Layout Planner Content:

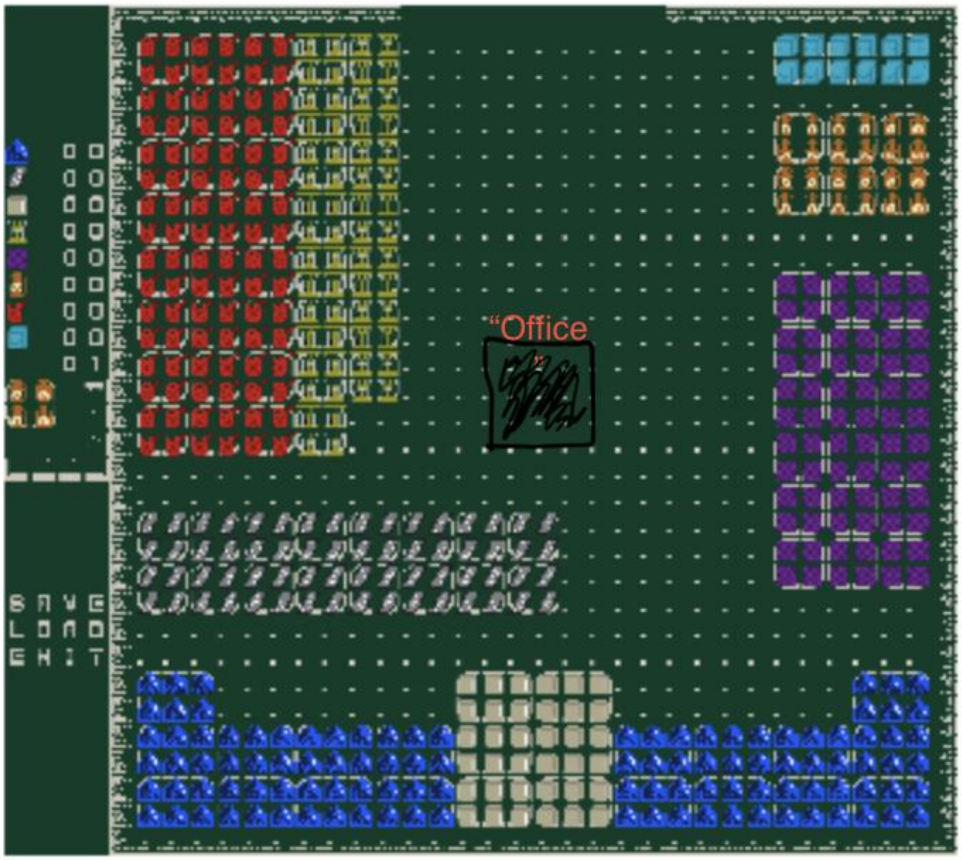
Our team first considered what items were to be prioritized over others to begin the basis of our warehouse layout. We put high-priority items near the front gate to provide ease of access and left enough space for forklifts to move through. The first challenge we encountered was the size of the office space which was required to be in the warehouse, but it had no priority listed. Due to this, we had to try working around the office space to fit all the items while keeping them in order of priority. The second challenge was simply fitting all the items within the constraints warehouse's size, but we found that placing the items around the walls of the warehouse worked best and left room for the office and forklifts to move about. Finally, the reason behind our final iteration was that it fit all the needs of the warehouse. All low priority items were placed towards the back wall of the warehouse, with all high priority items being placed near the front gate. This was all to accommodate the needs of the relief efforts, which is why my team believes that our warehouse layout is the best option to meet all the needs of the Humanitarian Relief group.

Conclusions and Recommendations:

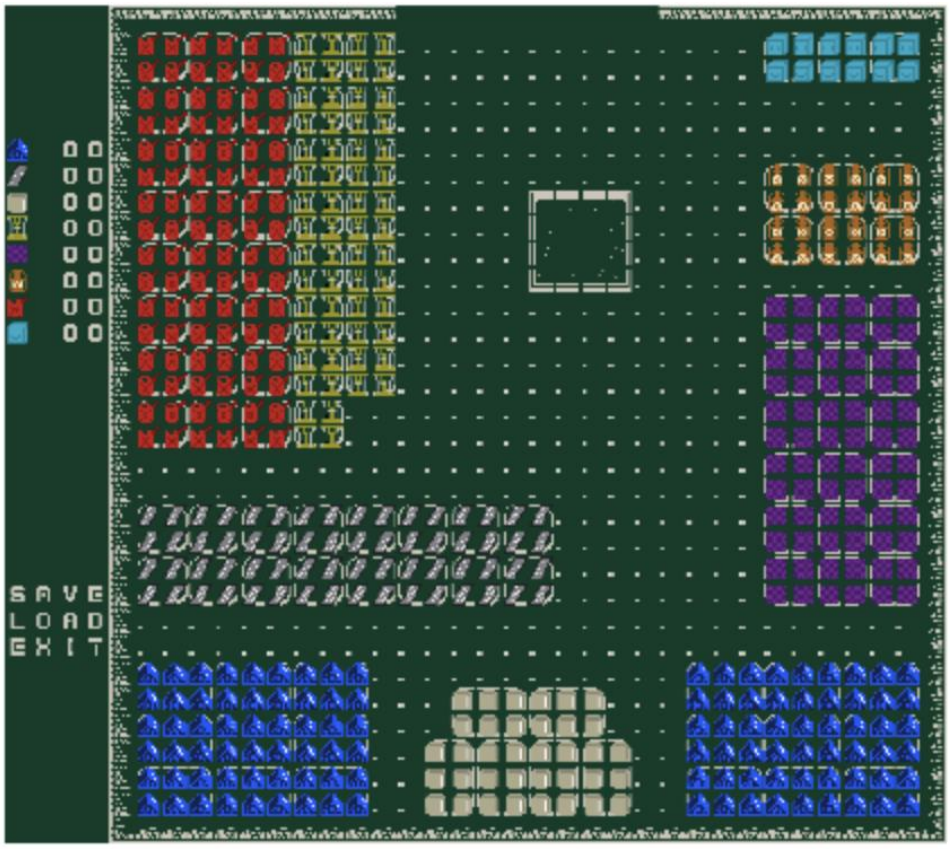
When a tragedy such as this earthquake in Tukastan strikes, it is the responsibility of engineers to find the best possible route of providing humanitarian relief to those in need. Based on the results of the current process map created that can be completed within 86 minutes, this can easily be optimized, and the time reduced to 62 minutes. This can be done by using two people to complete the tasks that are currently completed by an individual. This can also be done by completing tasks all at once rather than one at a time. Following these recommendations could greatly reduce the time needed to unload the cargo and therefore provide better humanitarian relief to the victims of this natural disaster.

Appendices:

Floorplan Appendix

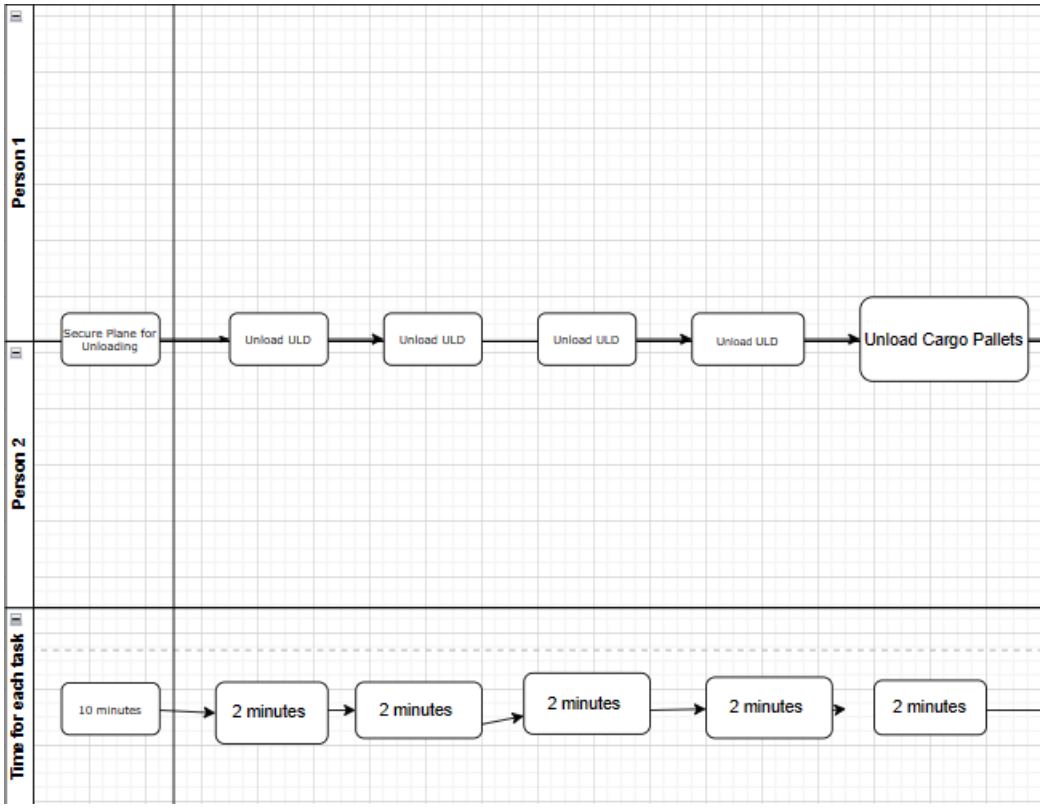


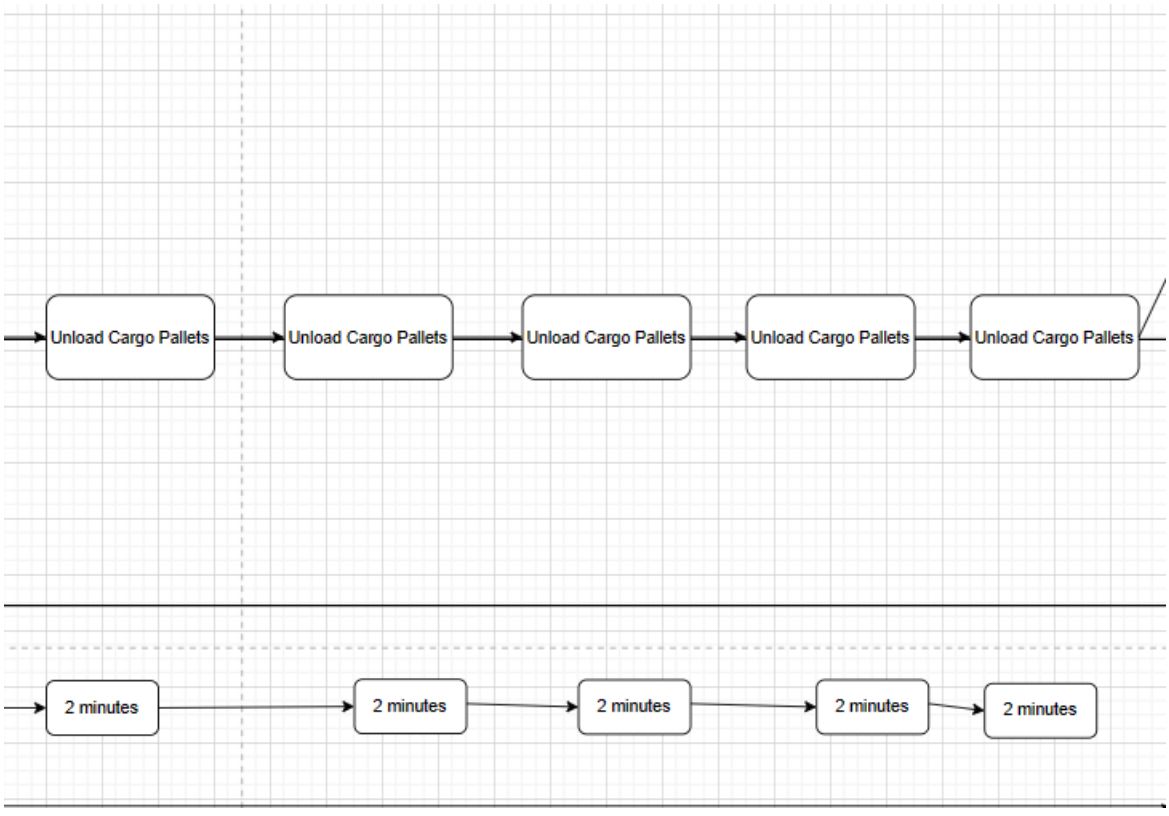
Initial Iteration

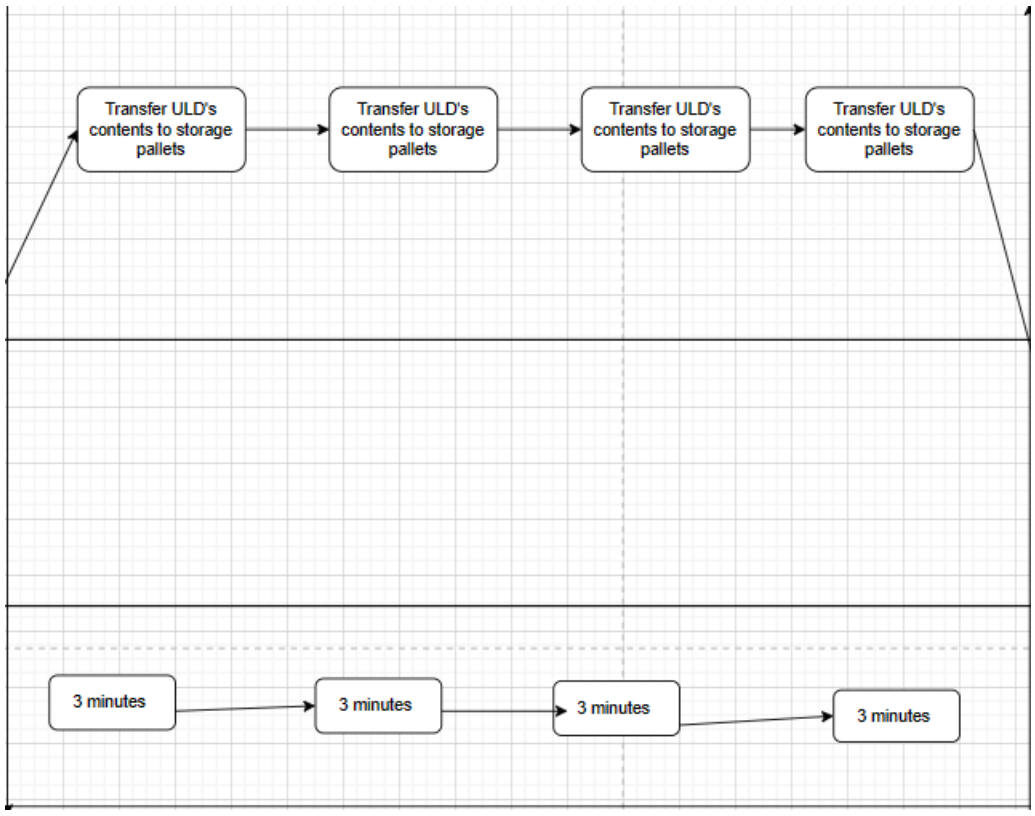


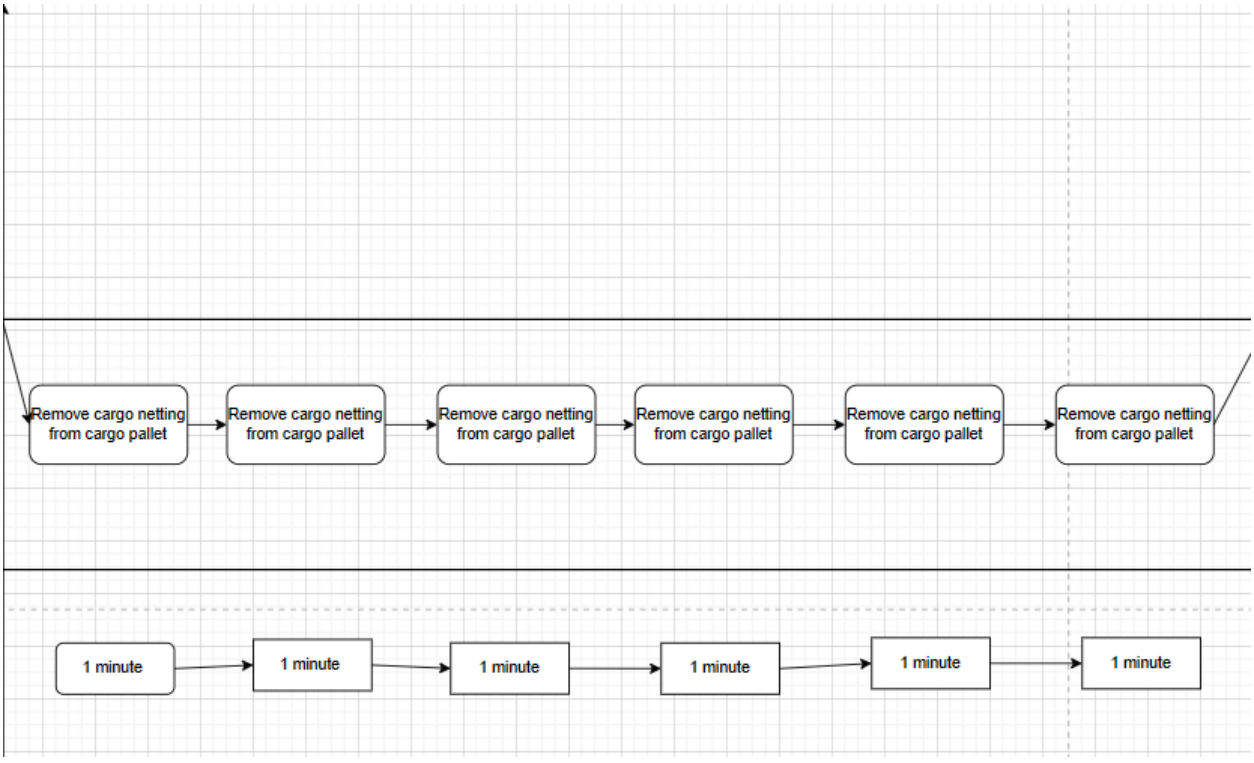
Final iteration

Process Map Appendix-






Transfer ULD's contents to storage pallets
Transfer ULD's contents to storage pallets
Transfer ULD's contents to storage pallets
Transfer ULD's contents to storage pallets
3 minutes
3 minutes
3 minutes
3 minutes


Remove cargo netting from cargo pallet
Remove cargo netting from cargo pallet
Remove cargo netting from cargo pallet
Remove cargo netting from cargo pallet
Remove cargo netting from cargo pallet
Remove cargo netting from cargo pallet
1 minute
1 minute
1 minute
1 minute
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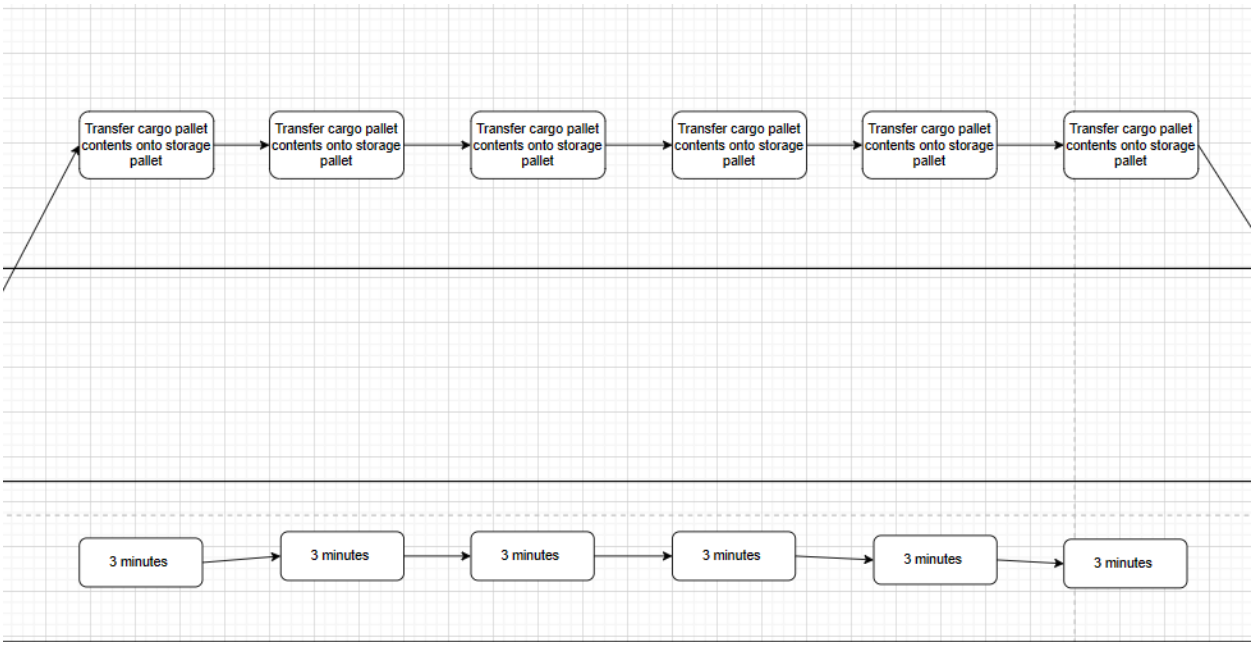
1 minute


Transfer cargo pallet contents onto storage pallet
Transfer cargo pallet contents onto storage pallet
Transfer cargo pallet contents onto storage pallet
Transfer cargo pallet contents onto storage pallet
Transfer cargo pallet contents onto storage pallet
Transfer cargo pallet contents onto storage pallet
3 minutes
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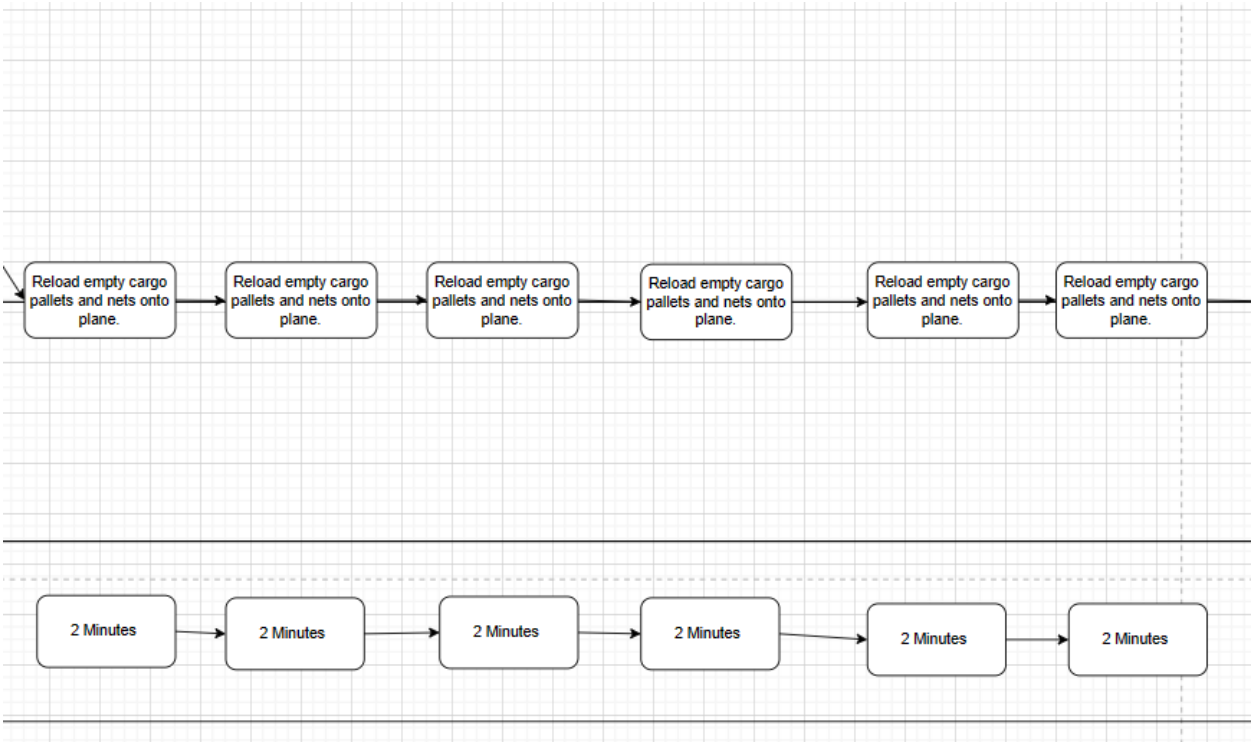
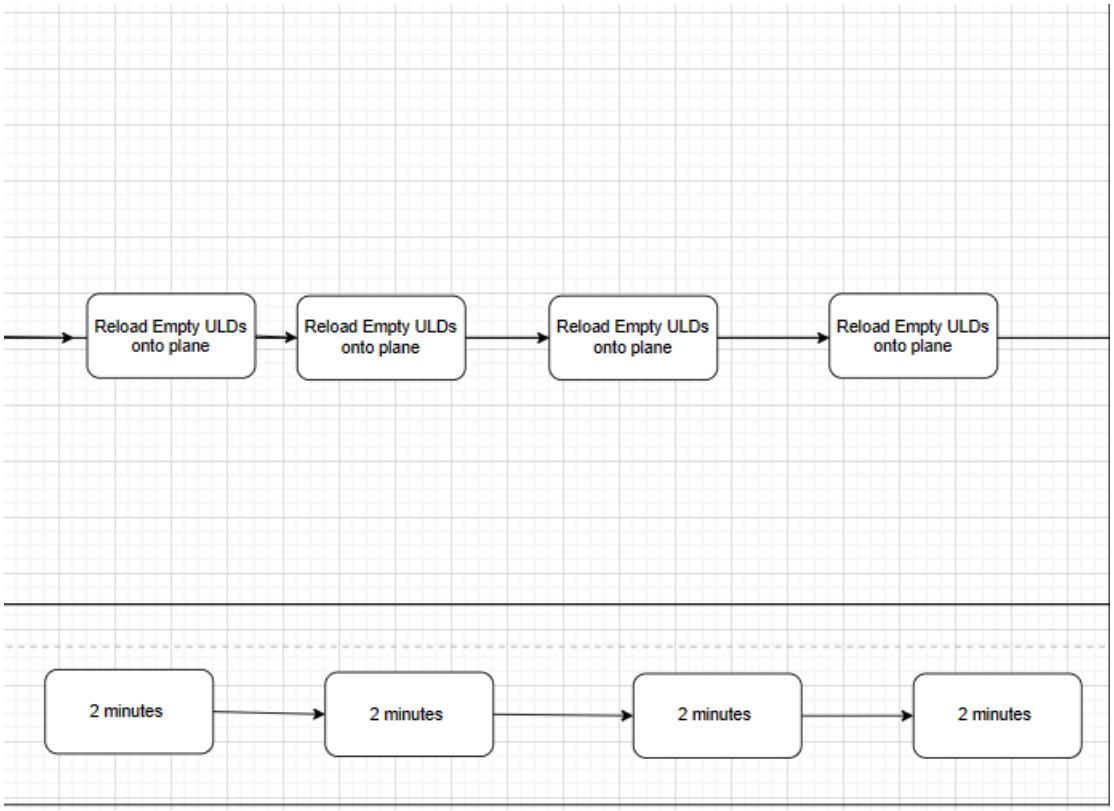

Reload empty cargo pallets and nets onto plane.
Reload empty cargo pallets and nets onto plane.
Reload empty cargo pallets and nets onto plane.
Reload empty cargo pallets and nets onto plane.
Reload empty cargo pallets and nets onto plane.
Reload empty cargo pallets and nets onto plane.
2 Minutes
2 Minutes
2 Minutes
2 Minutes
2 Minutes
2 Minutes


Reload Empty ULDs onto plane
Reload Empty ULDs onto plane
Reload Empty ULDs onto plane
Reload Empty ULDs onto plane
2 minutes
2 minutes
2 minutes
2 minutes

Excel Appendix-

Unloading Task	Time Required to Complete Task (min)	*Minimum* Number of People Required to Complete the Tasks	Total Time to complete task based on Number of People (min)
Secure plane for unloading (Task can only be completed by 2 people).	It takes **10 min** to secure the plane.	2	10
Unload 1 ULD container from plane to ground. **Note: There are a total of 4 ULDs in the plane and they can only be unloaded 1 at a time.**	It takes **2 min** to unload **1 ULD**.	2	8
Unload cargo pallets off the plane. **Note: There are a total of 6 cargo pallets in the plane and they can only be unloaded 1 at a time.**	It takes 2 min to unload **1 cargo pallet**.	2	6
Transfer ULD content to storage pallets (Task is currently completed 1 ULD at a time but this is not required).	It takes **3 min** to transfer the content of **1 ULD** to storage pallets.	2	6
Remove cargo netting from cargo pallets. (Task is currently completed 1 cargo pallet at a time but this is not required).	It takes **1 min** to remove cargo netting from **1 cargo pallet**.	2	3
Transfer cargo pallet content onto storage pallets (Task is currently completed 1 cargo pallet at a time but this is not required).	It takes **3 min** to transfer the content of **1 cargo pallet** to storage pallets.	2	9
Reload empty cargo pallets and netting onto the plane. (Task must be completed 1 at a time).	It takes **2 min** to reload **1 cargo pallet** onto the plane.	2	12
Reload empty ULDs onto the plane. (Task must be completed 1 at a time).	It takes **2 min** to reload **1 ULD** onto the plane.	2	8
		Total Time	***62***