The objective of this project was to organize the warehouse and provide designated locations for raw materials, pigments, additives, and WIP. The flow of the process needed to be linearized and material handling needed to be reduced. It was a goal to improve space utilization by 25%. To achieve these goals, the plan was to use Lean improvement skills such as studying the material flow with value stream mapping and implementing 5S methodologies to improve the efficiency of the warehouse operations.

To achieve the proposed goal to better organize the warehouse, the team implemented 5S methodology. The group started with the first S, Sorting, in which they eliminated all unnecessary items. The eliminated items included disposing 42 obsolete materials, relocating 7 flammable materials to a flame resistant location, and relocating 8 R&D items to a less accessible location. Also within Sorting, the group designated garbage disposal areas, pallet storage, overflow storage areas, and receiving areas. During the implementation of the second S, Straightening, the team proposed to label each item and storage location of the warehouse. They arranged the items in a manner that promotes efficient flow. This means that the items that are most commonly used are most easily accessible. To implement the third S, Shining, KYDEX promoted that at the end of each shift, the operators are to clean the work area and be sure everything is restored to it’s original location. The fourth S, Standardize, promoted work practices that are consistent and standardized. The team created a database with product SKUs and racking locations. The final S, Sustain, designed signs and banners to constantly remind people of the 5S culture.

A new inventory database was proposed to be introduced to KYDEX to locate materials locations quickly. This was a result of the standardizing S. This database base was updated upon each materials’ arrival. The database included information including the name, date received, operator’s initials, and item’s location. The location will be reassured using the CAD diagrams that were developed during this project. Another recommendation proposed was to develop a racking label and product receiving label for better product documentation and visual identification. On the label, there is important information that the receiving operator fills out and initials before sending the items to their designated area in the warehouse. The label is large enough for operators to read while it is placed on the item, as well as contains only vital information of the product.

5S posters were developed which are hung throughout the facility to constantly remind the employees of the 5S culture. The posters were commonly found on the walls of the entrances of the warehouse and represented the Sustain S. A main location of the poster was at the receiving area, where the operator updated the database and filled out the material’s label. The poster acts as a reminder of the 5S practices to keep the warehouse organized and efficient.

Initially, the team completed a process flow chart to get a better understanding of the warehouse operations and material flows. One key area which was eliminated was a WIP storage process that could last anywhere between 40 minutes and 4 days. KYDEX will use this process flow chart for reference in the future.

The team completed from-to charts to determine the best locations of certain types of materials within the warehouse. The team also collected and received a plethora of warehousing data which was manipulated in order to properly slot the SKUs within their designated product areas. The warehouse racking locations were slotted so that the bulk and high-volume items were placed in the pushback racking to get the best space utilization. Then, individual products were slotted so that the highest volume materials for each material type were placed closest to the beginning of the aisles, to minimize transportation costs during picking. A color coded pictorial is included in the report to show the difference of the warehouse before and after the changes. Also, a warehouse labeling system has been developed to code the warehouse for easier searching of materials. The labeling system consists of designating specific aisles and numbering racks and lettering the height level. This will essentially save time and frustration for all employees of KYDEX. Instead of taking 20 seconds to locate an item in the warehouse, the proposed coding system will allow to cut this time down to 5-10 seconds. The team recommended purchasing magnetic or stick-on labels that can be placed directly onto the racks themselves to locate items. This cost was estimated at $1,628.
The last proposal of the project was developing additional data collection metrics for the future. If some important warehouse data such as item / customer activity profiles and lines per order were to be collected and managed in the next year, KYDEX would be able to implement other potential slotting methods which would further improve the space utilization as well as order picking and material handling. To realize this, ABC analysis by popularity should be performed to maximize throughput and the classification of A, B, C should be determined based on the ABC codes discussed in section 8. Also, Lines/order activity profile could help determine the slotting methods as well as the most efficient picking methods. In addition to that, customer profiles (including order mix distribution, order lines distribution) and item activity profiles (including popularity profile, volume profile, item order completion profile) should be collected and analyzed for at least 6 months and preferably a year. Finally, to create these profiles, Microsoft Access or spreadsheet could be utilized so that the data could be managed in a clear-cut fashion. The team believes if these critical warehouse data were to be collected and analyzed appropriately, the inventory area would be operated and managed more efficiently and effectively which in turn eventually would reduce operating costs.

In conclusion, KYDEX will improve the warehouse using the recommendations the team proposed. The reorganization of material can be completed in 1 eight-hour shift with 2 forklift drivers, which is key because KYDEX operates 3 shifts over a 24 hour day and time is at a premium. The additional poster and label installations will take another 4.44 hours. With these recommendations, KYDEX will achieve the original objectives of improving the navigation of products and increasing organization efforts within the warehouse. KYDEX will improve the racking space utilization by approximately 14%, and all overflow items in the aisles and against walls will be eliminated and properly stowed in the racking system. This will eliminate roadblocks, waiting, and searching for items. If KYDEX standardizes and maintains the changes proposed, they will drastically improve their raw warehousing operations.