Functional Decomposition

Team 506 used the functional decomposition to breakdown the required systems for our project. These systems are the major components of the project and will provide the essential functions needed. The team used a hierarchy chart and cross reference table to depict the breakdown of the project's major systems and their functions. The major systems of our project are stabilization, compatibility, and support. These systems are then broken down into the major functions they provide to the project. The breakdown can be seen in the hierarchy chart. The hierarchy chart displays the functions under the system that it pertains to. On the cross-reference table, the functions that can apply to any of the systems will contain an “X”. This shows the overlap of the functions between the different systems.

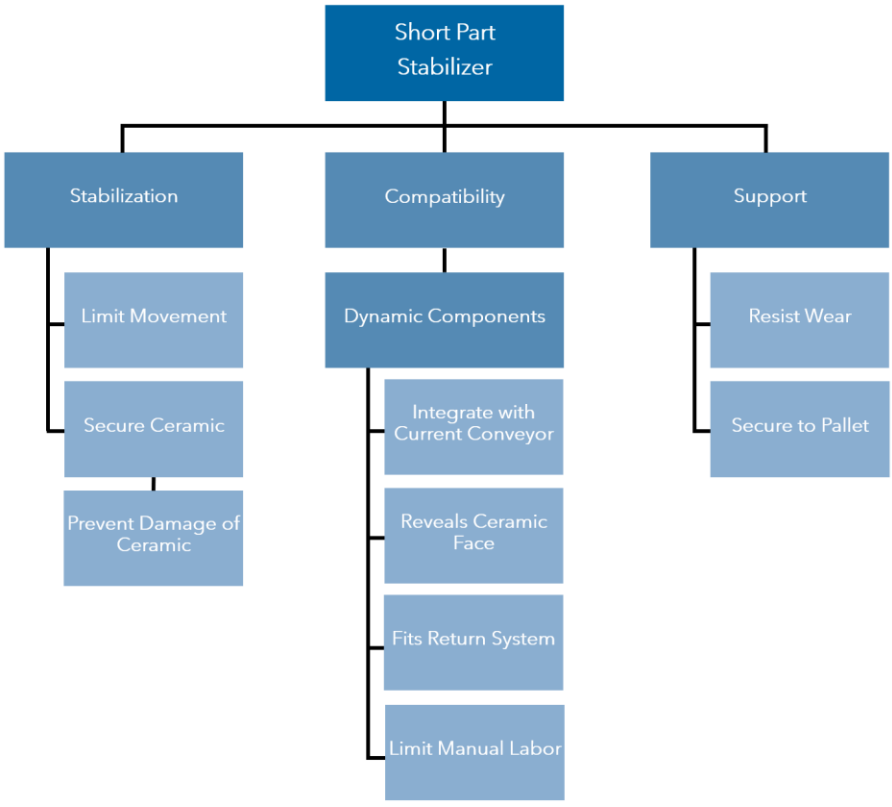

Figure 1: Hierarchy Chart

Table 1: Cross Reference Table

	System		
Functions	Stabilization	Compatibility	Support
Secure Ceramic	X	X	
Prevent Damage of Ceramic	X	X	
Reveal Ceramic Face		X	X
Secure to Pallet		X	X
Dynamic Components		X	
Resist Wear			X
Limit Movement	X		X
Integrate with Current Conveyor		X	X
Fits Return System		X	
Limit Manual Labor		X	

Explanation of Results:

The data that was used to generate the system and function breakdowns was gathered through several meetings with the project sponsor representatives, Jeffery Roche and Jeffery Stott. From these meetings the team was able to determine the major systems that our design would contain and the functions these systems need to complete. The major systems the team was able to determine were stabilization, compatibility, and support. Our design's main goal is to stabilize the short ceramics while they are being transported on the Corning conveyor system. The design also needs to be compatible with the current conveyor that the Corning factory uses. The last system of the team's design is to have the support capable of withstanding multiple cycles.

The stabilization subsystem's primary goal is to stabilize the ceramic while it is being transported on the conveyor. Within this subsystem the primary functions the team determined were to limit movement, secure ceramics, and prevent damage of the ceramics. The stabilization subsystem should limit the movement of the ceramics while they are being transported across the Corning conveyor. Currently, the ceramics will fall off the conveyor due to vibration from the belt and sudden stops. This knowledge allowed the team to then determine that, in order to limit the movement, the ceramics must be secured to the pallet. The security of the ceramics will prevent the ceramics from moving and therefore, prevent the damage of their ceramics.

The compatibility subsystem's primary goal is to guarantee the compatibility of the device with the current conveyor system. Within the compatibility subsystem the primary functions were determined to be the dynamic components of the device. The dynamic components consist of integration with the conveyor, reveals ceramic face, fits the return system of the conveyor, and limits manual labor needed to operate the device. The device needs to integrate with the current conveyor such that it does not obstruct any current overhangs, sensors, stopping mechanics, or directional changes along the rolling system. The device needs to be capable of revealing the ceramic face so the surface can be examined at different stations along the conveyor. The design needs to be compatible with the conveyor's current return system of the conveyor. The current conveyor uses an elevator mechanism to lower the pallets to a bottom level and return the pallets under the original conveyor. The device being compatible with the current system will limit the manual labor needed to operate the device. The current system in place requires an employee to manually remove and replace the stabilizer on the pallet at workstations and at the beginning and end of the conveyor. With the device being compatible

with the current conveyor system it will lower the manual labor needed with the ceramic stabilizer therefore lowering labor costs.

The support subsystem primary goal is to ensure the lifespan of the device under the conveyor condition. This subsystem has two primary functions which are to resist wear and to secure to the pallet. The resist wear function of this subsystem focuses on the ability for the device to not wear away over time. The device created should have the ability to be used repeatability without major impact to its functionality. Our team's design should also have a way for the device to secure to the pallet to ensure it is supported during operations. This function will allow for the device to remain on the pallet while in operation and prevent it from being easily pushed off due to conveyor vibrations and jerking.

All three main subsystems of the short part stabilizer have an influence on the overall usability of the design. Multiple functions overlap into different systems. This shows how the functions have cross subsystem relationships, the functions of the system may be important in a different category. Using the cross-reference table these relationships between systems and functions are marked with an “X”. The functional decomposition has helped the team determine that the short part stabilizer will need to be secure, interacted with minimally, easily integrated into the current conveyor system, and have a life expectancy capable of withstanding multiple cycles. These major functions will enable the team to develop targets and metrics of the designs key goal and prioritize the overall functionality of the project.