Virginia Beach City Public Schools
School Plant Services
Lean Implementation Project

Lean Principles have been around for many years and primarily used by private companies to improve their profit margins. In the spring of 2009, the administrative team at School Plant Services discussed the possibility of utilizing the Lean principles to help improve how we function as an organization. We discovered that there was a group of professionals working in the Virginia Applied Technology & Professional Development Center at Old Dominion University and they offered to come out and conduct an on-site evaluation of the facility and its general operation to see what areas exist that could be improved utilizing the Lean Continuous Improvement Concepts. Subsequent to that evaluation a proposal was submitted for a Lean Implementation Project that would focus on improving our ability to respond and deliver quality, timely, and cost effective services to the school division.

The first phase of this Lean Implementation project involved training in the basic Lean Principles and Value Stream Mapping. Twenty employees from various functional groups volunteered to attend this training and to participate as a team member on this Lean Implementation Project. The second phase involved generating a Current State Value Stream map of the overall process from a work order request from the school to close-out. Generating a consensus map proved to be a valuable exercise and since people from multiple shops were involved, no two maps reflected the actual process in its entirety. Getting consensus on the current state was critical to providing a baseline for improvement. Simply generating a current state analysis raised many issues that needed to be addressed by the project team. At this point the team generated a Future State map identifying what it should look like. This was done from the perspective of what should it look like if we were able to eliminate any/all non-value added process steps. At this point, base line metrics were established relating to; backlog, time to complete, age of work order, load by shop, travel distance and time, and accuracy of work order information.

The primary issues that the project team decided to focus on were;

1. To get the correct information from the school on the work orders so they could be correctly assigned to the appropriate shop thereby eliminating wasted travel time to complete a task.

2. To reassign simple work requests that were previously completed by highly skilled craftsmen to the school custodial staff.

3. To establish the appropriate inventory of parts on the service trucks and in the School Plant storeroom to ensure the craftsmen had the correct parts when they went to the school so as to support a timely repair and minimize the time lost to travel to and from the work site. (The goal was to rarely have a truck need to return to School Plant to get a part).

4. To balance the workload across the shops utilizing cross-training within a shop and across shop boundaries as well as and relocating positions to the areas of highest need.

5. To expand the preventative maintenance program and identifying all equipment that should be included in a life-cycle replacement program.

6. To continue to review ways to reduce the use of overtime.

7. To review contracted maintenance activities to determine if in-house personnel could assume more of these tasks.

8. To minimize travel time to and from the work sites by analyzing routes and work accomplished while at the job sites.

The following actions have been taken to address the issues above:

An online PowerPoint training initiative was developed and put in place to instruct the identified "Point of Contact" at each school in the proper submission method and information required on a work order. This effort will improve the accuracy of work orders received allowing for proper work assignment to the various skilled trades. Feedback was gathered from the various shops as to what information was required and what is frequently missing from the requests. The team has also developed and is piloting a method to visually tag specific items needing repair that are identified by the school contacts.

Personnel from School Plant Services and Custodial Services met and agreed upon a plan to have school custodians be responsible for simple repairs that had been previously performed by the higher paid craftsmen. A list of duties was defined and agreed upon. Required tools needed were identified, have been purchased by School Plant, and will be distributed to the head custodian at each site.

A parts strategy and training program was developed to focus on getting the correct parts from the storeroom prior to the craftsmen visiting the schools. It was observed that significant differences existed by shops and within shops relating to the on-hand inventory on the service trucks. Establishing and maintaining the proper inventory on the service trucks to reduce the amount of part-related travel time was accomplished by running historical usage reports of parts for each vehicle. Preliminary data indicates a significant reduction in mileage and fuel usage thus far by approximately 25%. This improvement was augmented by the incorporation of GPS systems on all vehicles.

The management of work orders has been improved by providing Netbooks to all craftsmen. All work orders are now received electronically thus allowing the craftsmen to more easily schedule their tasks and manage their workload. The netbooks provide an added bonus of providing the craftsmen with on-site accessibility to search out building schematic and systems information that will help them complete their assigned tasks. They can now access blueprints of all the facilities, fire inspection reports, utility cut-off locations, warranty documents, preventative maintenance, and other informational files while working anywhere within the school division.

An analysis was conducted to examine work order load for each shop by hi-lighting work order age, work order backlog, and work order by craftsman. This data is providing an insight as to how inter-shop cross training and job sharing can be utilized to reduce the outstanding backlog and work order age caused by shop workload imbalance. Zone responsibilities have been altered to better balance the work load based on this data. We also have continued the process of reviewing all vacancies to determine if they should remain in the same shop or advertised in a shop that has a more pressing, higher priority response time. We also determine if the position should remain in the day or in the Night Crew that operates from 2:30 to 11:00, Monday through Friday.

The preventative maintenance program in place is being expanded to incorporate additional systems and equipment. Inventory information is being captured in these areas and will be added to our preventative maintenance software. This action will have a positive impact on our ability to be more proactive instead of reactive.

Much of the work that has historically been accomplished in an overtime setting has been accomplished by the either the Maintenance Night Crew or the Mechanical Night Crew. We started the night crew eleven years ago with a few employees and now have increased to thirty-four employees in virtually every trade. We have hired many employees with multiple trade skills and cross-trained others that have helped us respond more appropriately and in a timely manner.

We have been successful in assuming responsibility for certain repairs that were previously contracted to an outside vendor. We have provided training to our in-house employees that allow them to perform these tasks. Not only does this save money, it also provides for a more timely response to requests and improves client satisfaction.

We have been successful in reducing the travel time by using the GPS that is installed on all vehicles. We now have the ability to see the routes taken each day and historically since the system was installed. We can make intelligent decisions based on the data that is retrieved. We have also stressed the need to accomplish all work orders for the same site at one time instead of using a first in-first out philosophy.

Even though we have just completed the project this past spring, we are already seeing positive results. The number of backlogged work orders and work order age has dropped dramatically during the project and continues to show positive impacts. Savings have also been observed as a result of the movement away from printing approximately 50,000 work orders annually. This

project initially caused concern among some of the employees at School Plant. There were misconceptions about the reason for taking on a project that required an in-depth look at how we operate as an organization. Some thought that it was a means to identify positions that could be eliminated, but that was not the intent. Instead, it was to be used as a mechanism to determine what actions were within our power to improve the services to our clients and reduce overall costs.

This project proved to be an effective activity that required everyone to analyze where we are, identify where we want to be in the future, and prescribe what would be necessary to get us to that future state. We have begun the journey that will take us to the future state. There is more work to be done, but the process was well worth the effort.