Supply Chain Analysis: What is the optimal delivery frequency for each store?

Overview
Vitamin Shoppe is a retailer and direct marketer of nutritional products and plans on shipping around 45 million units of product in 2011 to 525 stores and direct customers. Most stores currently receive two deliveries per week, handled by one of six 3rd party logistics trucking companies. The Vitamin Shoppe uses Pull distribution in their current process to deliver the products to the stores.

Objectives
The Vitamin Shoppe wants to determine the most cost efficient delivery schedule for each of their stores. TVS has a need for a tool to help evaluate the costs or savings of changing delivery frequencies to stores. The goal is to deliver an Excel tool to TVS to calculate the costs of changing and optimizing the store delivery schedules. The tool must be modifiable and updatable to suit the current needs of the company. The tool must highlight and recommend the most optimal delivery schedule according to the cost analysis.

Approach
- The Penn State Team visited the Vitamin Shoppe Distribution Center in North Bergen, NJ
- The team/sponsor determined the three most important costs of the network were transportation, inventory, and labor
- The team requested the necessary data from the sponsors to perform the calculations and determine the costs
- The Vitamin Shoppe store located in Harrisburg, PA was visited to make assumptions necessary for the labor cost calculations
- The Team developed a prototype using Microsoft Excel to come up with a delivery frequency evaluation model
- Once the prototype worked properly and the calculations were correct, the model was optimized to be completely user-friendly and easy to analyze.
- Based on the outcome of the tool, the team compared the current state to the future state
- The Team calculated total annual savings based on the tool’s schedule and provided recommendations based upon the analysis of the savings

Outcomes
- Implementing the tool’s optimal delivery frequency output on all of the stores will result in an annual supply chain savings of around $299,000
- The Team recommends implementing the tool on the 19 stores listed that account for $117,547.28 in annual supply chain savings
- The stores on the GMCH and AX05 routes have a total annual savings of $123,540.82 and $71,046.51, respectively