

Executive Summary

The Cal Poly Corporation and Campus Dining face the challenge of meeting the growth of students and dining venues on campus with the limited space capacity of their warehouse in building 19. Given a \$250,000 budget, Campus Dining has an option to keep the warehouse at the current location at building 19 or moving the warehouse to building 82 off Mt. Bishop Road. Each warehouse location has its benefits as building 19 is in the center of campus and building 82 has much more shelving space than building 19. The objective of this project was to select the better choice for the warehouse location in order to meet the growing number of students and dining venues by comparing the efficiencies between the two choices.

In order to accomplish the objective, the warehouse processes were defined as receiving, storing, picking, loading, and delivering to the dining venues. A small amount of time studies were taken from building 19 for the five warehouse processes and were analyzed to create a linear regression line, which led to using a random number generator and the computer program Stat:Fit to find the best distribution function for each process. This information was inputted into ProModel, a simulation software that was used to simulate both warehouse locations. The information for building 82 inputted into ProModel was logically altered from the data from building 19. The simulation was run for 160 hours with 10 replications, which is roughly the amount of time the warehouse runs per year. The important output from the simulation was the average time in system, which signifies the amount of time the inventory was not sitting in permanent storage. In other words, it details the efficiency of each building's warehouse.

A statistical comparison was run between the two models using a two-sample t-test because of the small sample size. The null hypothesis was that the buildings' average time in system was equal and the alternative hypothesis was that they were different. With 95% confidence, the buildings' average time in system was not equal and building 19 actually had a lower average time in system, proven by the 95% confidence interval of the difference between the two as (-50 minutes, -37 minutes). This means the warehouse in building 19 is more efficient with the handling of the product. However, building 82 has a greater shelf space than building 19 and therefore larger inventories are handled, which leads to its greater average time in system.

An economic analysis was run between the two buildings as well by calculating net present value over a 25 year period. The present worth of building 82 is -\$2,591,876 and building 19's is -\$3,817,747, which means building 82 is of greater value over the period of 25 years. One of the reasons for this is the number of vendor deliveries is cut in half because of the potential of building 82 to hold more inventory.

The final recommendation from this project was to move the warehouse location out to building 82 to meet the growing number of students and dining venues on campus.