

Layout Optimization of a Start-up COVID-19 Testing Kit Manufacturing Facility

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Abstract : The global COVID-19 pandemic has affected the industry drastically in many ways. Even though the vaccine is being distributed quickly and despite the decreasing number of positive cases, testing is projected to remain a key aspect of the 'new normal'. Improving existing plant layout and improving safety within the facility are of great importance in today's industries because of the need to ensure productivity optimization and reduce safety risks. In practice, it is essential for any manufacturing plant to reduce nonvalue adding steps such as the movement of materials and rearrange similar processes. In the current pandemic situation, optimized layouts will not only increase safety measures but also decrease the fixed cost per unit manufactured. In our case study, we carefully studied the existing layout and the manufacturing steps of a new Texas start-up company that manufactures COVID testing kits. The effects of production rate are incorporated with the computerized relative allocation of facilities technique (CRAFT) algorithm to improve the plant layout and estimate the optimization parameters. Our work reduces the company's material handling time and increases their daily production. Real data from the company are used in the case study to highlight the importance of colleges in fostering small business needs and improving the collaboration between college researchers and industries by using existing models to advance best practices.

Keywords : computerized relative allocation of facilities technique, facilities planning, optimization, start-up business

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