

Manufacturing Material Flow Transformation

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Table of Contents

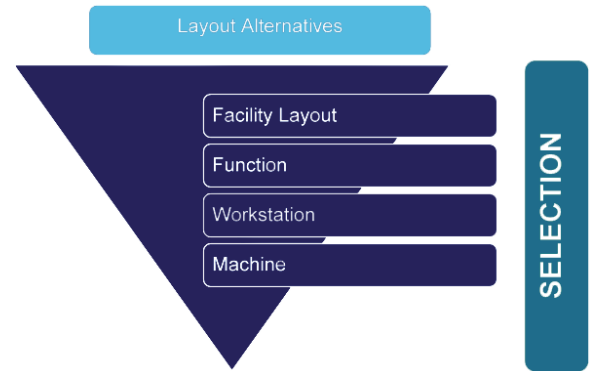
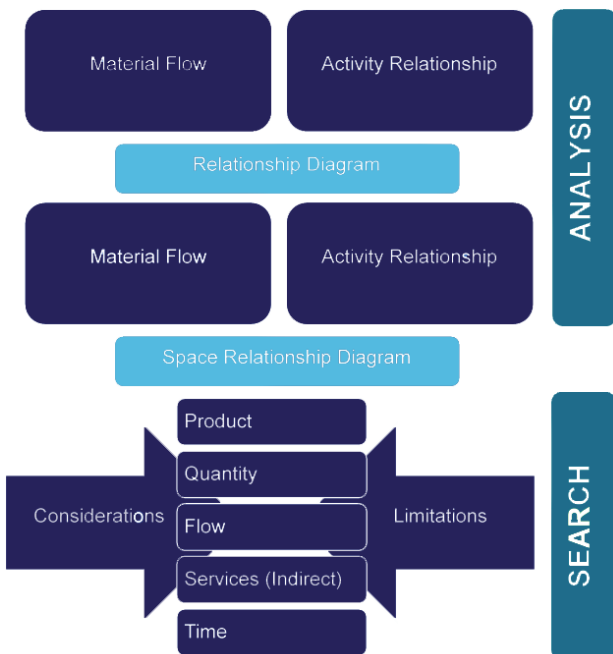
Facility Layout & Material Flow Optimization.....	2
Systematic Layout Planning (SLP).....	2
Impact on Lean Methodologies.....	2
Plant Operations & The Culture Change.....	3
CGN Approach.....	3
CGN Solution Methodology.....	3
CGN Value.....	3
References.....	4
About CGN.....	4

Facility Layout & Material Flow Optimization

Facility layout is the way in which operator work stations, machines, raw and finished goods, logistics, and employees are arranged within a work facility; therefore, it has a major impact on overall plant productivity and operating cost. According to the International Journal of Engineering Research and General Science, it is estimated that material flow cost contributes from 30 to 70% of the total manufacturing cost, subject to the type of industry (Dongre, A., & Mohite, N. Y.). The goal of facility layout and material flow design is to find the most effective facility arrangement and minimize material handling.

Systematic Layout Planning (SLP)

A common tool for arranging a facility and optimizing material flow is systematic layout planning (SLP). The three overarching steps from Muther and Hales' SLP include (1) analysis, (2) research, and (3) selection. These steps need to be applied in a multifaceted approach: side-by-side analysis with quantitative and qualitative requirements as well as macro to micro level detailing. The process is as follows:



Impact on Lean Methodologies

Plant layout and material flow optimization are critical in improving resource utilization and creating an infrastructure to apply lean methodologies and tools such as 6S, JIT, 8 wastes, mistake proofing, TPM, SMED, etc. Lean tools not only contribute in reducing cost, but also benefit the organization by improving an overall plant's SQDC management approach.



Plant Operations & Culture Change

Facility layout design and material flow optimization are often considered a time-consuming process and difficult tasks. In the analysis phase, extensive data collection must occur to capture the requirements of all functions (Asad et al.) Requirements include, but are not limited to, available space, material movement, safety and ergonomics, employee satisfaction, flexibility, and available capital. Finding the right layout balance to satisfy each of these requirements in the selection phase is complex, considering priorities for each stakeholder are different. Oftentimes, facility layout must undergo several iterations of redesign to alleviate the site's current production needs and bottleneck.

CGN Approach

CGN understands material flow impact caused by the complexity of multiple workstations, various methods of material movement, constrained space for handling, and other production requirements. We aim to transform our client's facility layout and material flow, and thereby reduce the lead time as it is of critical concern and will impact consumers. The transformation solution used focuses on in-depth analyzes of each part and develop a plan for each part (PFEP).

CGN Solution Methodology

After the initial focus on PFEP, acquiring part classification information, performing time studies regarding current material routes, and completing line side presentations, the following changes will be made to ensure most effective route from receiving to picking to kitting & line-side replenishment, will be implemented:

- Rearranging warehouse racking
- Relabeling bin locations
- Creating designated locations (based on usage and product complexity)
- Widening aisles for Tugger carts
- Redesigning assembly stations to accommodate widened aisles
- Completing total 6S

These changes will coincide with the implementation of

newly designed replenishment routes, utilizing Tugger carts to solve excessive traffic, as well as reduce the facility's current number of milk runs.

Since CGN's material transformation framework extends to the workstation level, including new bin organization, labeling, and 6S with predetermined reorder points, line side arrangement will be designed to match cart replenishment routes while remaining ergonomically friendly for operators and bringing parts closer to their strike zone.

Lastly, CGN will implement total warehouse automation to sustain facility organization and re-allocate labor to support other production tasks such as receiving, picking, kitting, and assembly, given the current labor constrained market.

CGN Value

CGN has over twenty years of experience in end to end supply chain. Our ultimatum would be to meet the goals set by client's leadership and go beyond. CGN Global is uniquely positioned to recognize and address the impact on material flow. CGN transforms organizations worldwide to improve performance, profitability, and global competitiveness. We use our diverse experience and broad knowledge to provide strategic insights, actionable recommendations, and focused execution to drive results. We identify the challenges and the market opportunity with the current impact of tariffs on businesses.

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References

1. Dongre, A., & Mohite, N. Y. (2015). Significance of selection of material handling system design in industry-A review. *International Journal of Engineering Research and General Science*, 3, 76–79.
2. Muther, Richard, and Lee Hales. *Systematic Layout Planning*. 4th ed., Management & Industrial Research Publications, 2015.
3. Syed Asad Ali Naqvi, Muhammad Fahad, Muhammad Atir, Muhammad Zubair, Muhammad Musharaf Shehzad & Wenjun Xu (2016) Productivity improvement of a manufacturing facility using systematic layout planning, *Cogent Engineering*, 3:1, DOI: 10.1080/23311916.2016.1207296

About CGN

At CGN Global, we help companies worldwide overcome core business challenges of growth, margin, and responsiveness. Going beyond simply solving their problems, we quickly and effectively deliver transformational results that are sustainable.

That's because we deliver results, not reports. We help our clients solve difficult problems and become winners in the marketplace. We do this with a powerful combination of good thinking, broad capabilities, and sheer drive to go beyond what's expected.

It's what we do - and we've been doing it for more than 20 years.