

Systems-Based Engineering Decision Example

Boeing 787 Dreamliner: Material Selection Impact on Global Supply Chain

This project, led by Boeing, is a prime example of the effectiveness of systems-based engineering reasoning. The use of carbon fiber composite materials was a strategic decision made by Boeing to reduce excess weight as part of an aircraft redesign aimed at making airplanes more fuel-efficient. However, the innovative use of carbon fiber composites in its airplanes led to a complex and highly intricate network across its global supply chain (Schmuck, 2021). These advancing technologies changed the way these aircraft were produced, requiring Boeing to develop entirely new processes, utilize different equipment, and even train its current and future engineers and technicians in the new skills and techniques needed to handle these advanced materials.

Many of Boeing's suppliers could not adapt quickly enough to stay ahead of these changes, causing the entire system to stop due to the numerous parts that differed from the design created by the program's engineering team. This was also responsible for a slower-than-planned schedule, which sometimes actually costs more in the end when missing deadlines continually delay work and performance. This event has highlighted the significant influence of engineering decisions on the downstream aspects of logistics processes. To minimize delays, Boeing acquired or entered partnerships with specific suppliers, specifically to ensure the continuity and accuracy of its supply chain. The extended impact of engineering decisions on logistics, operations, and human resource systems has been explained here. This exemplifies systems thinking, as it explains that design decisions can influence the broader operational network and that a coordinated plan is needed to ensure the overall plan is not affected.

Reference

Schmuck, R. (2021). Global supply chain quality integration strategies and the case of the

Boeing 787 Dreamliner development. *Procedia Manufacturing*, 54, 88-94.

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