Systems-Based Engineering Decision Example:

In a hypothetical highway construction project, the engineering team decided to increase resources by way of assigning additional workers and testing a new automated concrete-laying system, preferring to reduce delays and meet an approaching deadline. Initially, activity quickened, while overtime resulted in worker fatigue, and the integration errors of the new system dragged down quality, e.g., misaligned sections that had to be reworked, resulting in further delays. Client pressure worsened, driving in more resources in an R1 reinforcing loop. Anticipating such risks via a causal loop diagram (Sterman, 2000), I came in and altered the approach by cutting back on workers, improving on the automation process, and instituting staggered shifts such that quality and schedules balanced out in a B1 balancing loop. This is a lesson in how having a systems view to anticipate fatigue, quality, and innovation impacts is crucial to tackling the interconnected project dynamics (Meadows, 2008).

References:

Meadows, D. H. (2008). Thinking in systems: A primer. Chelsea Green Publishing.

Sterman, J. D. (2000). Business dynamics: Systems thinking and modeling for a complex world. McGraw-Hill.