Lean Railroading

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One of the more intriguing applications of lean I encountered recently – one I had not come across before – is "lean railroading."

I heard that term from Jeremiah Dirnberger, who is a graduate research assistant in the Railroad Engineering Program at the University of Illinois at Urbana-Champaign. At the recent conference of the Institute of Industrial Engineers, he described a research project he'd been involved in aimed at making railroads more efficient.

The study focused on classification terminals, which are large rail yards where the cars from a long incoming freight train are uncoupled and reconnected into other trains that will take them to their ultimate destinations – a kind of distribution center for rail freight.

For the railroads to run on time, the terminals must operate efficiently. A terminal may handle dozens of trains and hundreds of cars at any given time, so achieving efficiency is, to put it mildly, a challenge. A 2004 study found that cars typically sit idle for 71 percent of the time they spend at a terminal.

To make matters worse, existing terminal capacity is insufficient to handle today's volumes of rail freight traffic, and building new terminals is prohibitively expensive.

A major benefit of lean is increased capacity. And when one looks at a classification terminal as "a factory that makes connections in the form of trains," as Dirnberger did, it's easy to see how lean principles can apply.

However, the approach taken by the Railroad Engineering Program involved not just lean concepts, to reduce waste, but also theory of constraints to address bottlenecks and statistical process control to help reduce variability.

One key area the study identified was the sorting process. In a nutshell, the cars from an incoming train are uncoupled and sorted on to a variety of tracks, based on ultimate destination. This continues with additional incoming trains until all the cars heading for a particular destination end up together, sorted on to one track. They are then assembled into an outgoing train.

The problem is that sorting never works perfectly. Sometimes a car gets sorted on to the wrong track, in the middle of a bunch of other cars whose destination it does not share. That problem must be solved – the errant car must be pulled out – before the outgoing train can be made ready to leave. And that takes time.

I won't go into all the details here, but the research proposed greater effort during the initial sorting – with some helpful techniques suggested – to prevent sorting errors at the outset, eliminating the need to solve them later. (Solving a problem when and where it occurs – where have we heard this before?)

Applying lean concepts to supply chains is not new. *Lean Supply Chain Management* and *Kanban for the Supply Chain* are examples of books we publish in this area.

But most such approaches focus on the extended value stream for a particular product, from raw materials to production through distribution.

The research Dirnberger presented is different, taking a distribution link, treating it as a production operation and analyzing the process by which trains are created. This is a clever and meaningful approach, and one that could have a real impact on those trains coming down the track. It's the kind of outside-the-box thinking that we all should encourage and pursue.