

Long Term Transportation Efficiency May Be Best Served By Shorter, Not Longer, Trains, and Vehicles To Make That Possible

Over the past several years, railroads have increasingly operated longer and longer trains. And they propose to continue doing so. Whether the public interest is served by this trend has been questioned. Recent infrastructure legislation authorizes a two year study of railroads' use of ever-longer trains and their impact on safety, grade crossings, freight and passenger service, and the environment; including derailment risks; communication issues between the head-end, distributed power units, and end-of-train devices; and train handling and braking. That study also will look at whether engineers and conductors need additional training to safely operate long trains. (*Railroads Use of Long Trains To Go Under the Microscope – Trains, Nov 15 2021*) The more recent catastrophic train derailment in East Palestine, Ohio will put even more focus on questions surrounding the risks of longer and longer trains. (*'The Longer the Train, the Heavier the Train' – Ohio disaster calls attention to freight's growing bulk, POLITICO, Feb 16, 2023*) Among other problems, ultra-long trains have reportedly blocked first responders on numerous occasions.

Railroads' defense of plans for longer and longer trains rests on assertions of reduced greenhouse gases, and better fuel and locomotive efficiency. Coincidentally, but often left unsaid, longer trains enhance railroads' profitability by reducing the number of crews otherwise required and facilitate the high profitability associated with long trains carrying bulk material from and to fixed points of origination and destination.

This zero-sum game, balancing railroad profitability against the public interest, might be avoided by a counterintuitive long-term strategy enabling shorter train lengths and even individual vehicle travel over the tens of thousands of miles of existing rail lines that sit idle much of every day. Combining that expanded use of existing railroad infrastructure and the accompanying significant possibility of increased railroad profitability with the diversion of much long distance over-the-road trucking from already overcrowded highways to rail lines would be a win-win for both railroads and the public interest.

With the existing paradigm, railroads cannot compete with the point-of-origination to point-of-destination convenience of trucking, though railroads have attempted to do so with containerized freight transported intermodally on trucks and trains. Despite enormous investment in infrastructure to support that intermodal transport scheme, the inherent time and scheduling constraints of that modality limit its utility and its prospects for significant growth, as discussed by railroad insiders, such as Jim Blaze (*Where Intermodal Can and Will Grow - Railway Age, Dec. 26, 2022*) and Gil Lamphere (*Why Intermodal Isn't Everything It's Cracked Up to Be - Railway Age, April 13, 2022*).

THE enormity of the change required to integrate concepts of shorter trains on existing rail networks, cannot be overlooked. So why even consider it? And, more

specifically, what might be necessary to facilitate this change?

A long-range view reveals the countervailing impact of containerized truck-rail intermodal transport on railroads' profitability objectives. As indicated above, growth of that modality, long envisioned to enhance railroad profitability by diverting freight shipment from trucks to rail lines has largely stalled. Worse, the success of that modality depends on simulating the flexibility of truck shipping while facing the inherent inflexibility imposed by the assembly and scheduling of ever longer trains. While industry observers differ as to possible solutions to enhance intermodal growth, they agree that it faces headwinds, some of which necessarily involve the trend to ever longer trains.

Railroads also proudly ascribe their movement to Positive Train Control, as mandated by developing safety regulations, in combination with Precision Scheduling Railroading systems to better manage train traffic as evidence of the industry's adoption and implementation of computerized systems. Presumably such systems could operate irrespective of train length and unit types and numbers.

In short, railroads depend on heavy loads of bulk commodities in long trainloads regularly transported from one point to another to provide the high profitability for which railroads are known. That dependency, however, burdens railroads with disincentives relative to their efforts to divert truck traffic to rail transport. While containerized freight transported intermodally by trucks and trains has been hailed as a way to increase railroad profitability by diversion of truck freight to containerized truck rail intermodal, the growth of that modality has stalled. One possible answer?

Autonomously drivable vehicles capable of both rail and road travel would facilitate highly flexible intermodal transport to greatly increase rail usage and railroad profitability

Autonomously drivable vehicles are well within the scope of existing technologies. The change would also be beneficial to shippers, in the form of more efficient transportation and to the country generally by the diversion of heavy truck traffic away from the nation's highways.

Apart from the diversion of truck traffic from overused, congested highways and the increased toll potential for railroads, autonomously drivable, rail-capable vehicles, in place of conventional rail cars could radically reduce the time and infrastructure required for train assembly, disassembly and reassembly, those activities now requiring thousands of miles of railyard switches and involving untold time constraints.

Other ways in which railroad efficiency and profitability may be positively impacted by the integration of rail-capable trucks include the supplementation and possibly replacement of locomotives with self-powered trucks, and the potential for shorter trains better matched to the individualized point-of-origination to point-of-destination of the cargo carried by mixed cargo trains.

Nor need shorter trains of mixed cargo with multiple points of origination and destination mutually exclude longer trains carrying a single cargo from and to fixed points of origination and destination. As indicated above, computerized train scheduling, already in use, surely could accommodate both.

Taking all of these factors into consideration, and without abandoning the heavy bulk commodity, high profitability trains already in operation, integrating shorter trains and possibly even individual vehicles traveling over existing rail networks could increase rail usage and toll income, while providing intermodal flexibility not unlike the point-of-origination to point-of-destination flexibility enjoyed by truck shippers.

Key to this envisioned intermodal model . . .

would be trucks, capable of both rail and highway travel, seamlessly transitionable between those modes, and autonomously drivable to make that transition. Remotely controllable couplers would enable integration of such trucks into conventional trains and convoyed rail travel of multiples of such trucks, though not necessarily excluding travel of individual trucks on railways if that turns out ultimately to be efficient and practical.

What would make this change possible? Vehicles capable of traveling on roads and rails would be a first requirement. Many such vehicles have been proposed, as for example:

A development vehicle proposed by Silvertip Design Inc, Skeeby, Richmond, North Yorkshire, UK



And this over-the-road and rail vehicle promoted by Intramotev Inc, St Louis, MO



Such vehicles with appropriately integrated electronics could be autonomously driven in transition from road to rails and vice versa and, in rail travel, by rail network electronics. Other implementing adaptations might include remotely controlled couplers for integration with conventional train cars and convoying of similar vehicles. Wheel systems capable of seamless transition from road to rail and vice versa would also be required. But all of these adaptations are well within the scope of available technology and have been already proposed elsewhere or in articles accompanying this one.

Integration of Rails and Roads, a Vision Not to Be Overlooked

Those responsible for current transportation management will likely find many reasons why the initiative proposed above is impractical and unwise. It remains to be seen whether those responsible for long range transportation planning will have the vision to overlook these criticisms and instead consider the upside potential for all parties, the public, shippers and, most of all, the railroads. All would benefit.