



Security, Capacity & Risk Management:  
The Case of TIH Products & the Pressure Tank Car  
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### Background

Security and safety concerns over the nation's freight lanes are heightening at a time when traffic congestion is more broadly and acutely felt than ever.

This past June the House Subcommittee on Rail Transportation held hearings on the issue of tank car safety, and the rail transport of certain hazardous materials known as Toxic Inhalation Hazards (TIH). Railroads complain that they cannot get insurance coverage for TIH products, which represent a fraction of 1% of traffic, but represent billions of dollars of potential liability. One might ask, rail carriers have handled these products for years, why would this become an issue for them now? I'll offer a few possible factors:

First, we are moving, some might say too slowly, from the safety era of the late 20<sup>th</sup> century, into the security/safety era of the early 21<sup>st</sup> century. The three most tragic terrorist attacks on US soil demonstrated the vulnerability of our infrastructure to terrorists, particularly suicidal one's who use our presumed benign technologies and transport network horrifically against us. I suspect many a rail carrier executive has had a few sleepless nights since these events pondering the vulnerability of their systems to such attacks.

A former Coast Guard Commander and security expert, Stephen Flynn, has set forth what I think is an important set of perspectives on the issue in his 2004 book *America the Vulnerable: How Our Government is Failing to Protect Us from Terrorism*. Flynn makes the point in his book that an effective way for us to think about how we can adopt "a more thoughtful and constructive approach to security is to reflect on how we came to manage the safety imperative". He goes on to write generally about the transition business leaders have made over the century in their view of safety; away from the early industrial era notion that safety was an imposed burden, the cost of which undermined profits, re-investment and further development, to the current view of safety as a valued necessity.

The rail industry offers an excellent example. At the turn of the last century there were about two million railroad workers in the US, or ten employees for every one today. Back then, every day, one to two hundred railroaders died on the job. Those who lost their lives were mostly brakemen whose job was to run across the top of moving trains to turn the brake wheels on each car to stop the train. Irish folk songs that lamented about "Paddy don't work on the railroad" were not quaint rhymes, but sincere warnings. Tragically, the technology to eliminate this hazard had been invented decades before by Westinghouse, but was viewed as an uneconomical technology.

Now, Flynn writes, "safety considerations are no longer an afterthought undertaken only in response to specific accidents... They have become an organic part of our daily lives." To that point, in all of 2004 there were fewer on-the-job deaths in the rail industry than would take place in just a few hours in 1904. Congressional hearings related to tank car risk and security, certainly conferences like this one focusing on the logistics of emergency response and prevention are healthy signs that we are moving into the security/safety era.

A second factor spurring rail carriers to raise concerns over TIH traffic has been the seven incidents, many of them high profile, involving TIH releases from pressure tank cars since 2001. According to the NTSB, these incidents involved about 20 individual pressure tank cars carrying TIH, 15 deaths, over 400 injuries many of them serious, thousands of evacuees from dozens of square miles of commercial and residential neighborhoods, and nearly \$40 million in damages. This string of incidents puts into tragic focus, the risk of carrying such material on the rail system. NTSB ruled all of these incidents as industrial accidents, not sabotage.

Thirdly and perhaps most importantly, available capacity on the rail system has tightened significantly in the last ten years, particularly since the recovery from the 2000/2001 recession. From 1950 to 1995 railroads lost more than half their market share to trucks and barges. Over this time the rail car fleet fell from over 2 million to 1.2 million units, while rail system track miles fell from 215,000 to about 110,000. These numbers reflect the impact of rapidly expanding highway capacity during the period, in the form of both increased lane miles (e.g. construction of the interstate highway system) and truck size and weight limits. Since '95 however the loss of intercity freight market share by rail to truck has ceased and recent indicators more than suggest that rail is now recovering market share from trucks.

The "orange barrel syndrome" on our highways, along with higher fuel and labor cost (factors that are far greater shares of truck cost versus rail) serve to boost rail system competitiveness relative to truck for a greater and greater share of intercity freight. Additionally, sectors predominantly served by rail such as heavy manufacturing, merchandise trade (imports), grain and coal have seen healthy freight demand increases. From 1995 to 2004, ton-miles per track mile have expanded from 11.4 million to 17 million, almost as much growth as we'd seen in the previous 5 decades. Moreover, rail capacity is now growing, unlike previous decades, as rail track miles are up 2,000 since 1998 and the rail car fleet has expanded from its low in 1992 of 1.2 million units to 2006 estimates of over 1.6 million.

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While the rapid rise in ton-miles per track mile is an indicator of the formidable progress in rail operating productivity, it also points to the fact that rail systems are more clogged than ever before. The congestion has started to impact operating performance. One indicator, system average train speed (train miles per train hour), has fallen 0.8% per year since 2002, after showing sustained gains averaging 0.33% per year from 1997 to 2002.


Greater rail system congestion brings not only tougher operational challenges for the railroads, but from the rail shareholders perspective, an improving array of traffic choices. In this environment, TIH products are looking less and less attractive due to greater demand for service towards equally valuable, non-TIH traffic. A key ingredient to the rail carrier's perspective on TIH traffic is the regulatory limits imposed on what railroads can charge for TIH shipment over and above certain defined "long-term variable costs". At current prices, TIH is becoming unattractive, because railroads perceive the price limits leave them with uncompensated liability and risk for the carriage of such freight.

If significant cost (catastrophic risk) of TIH transport is in fact left uncompensated, economist would view this as a subsidy. That leads to the question of how many safe or at least far safer alternatives to some of these TIH products never reach the market because the development cost of market placement must compete against a line-up of currently used products whose cost of transport is subsidized.

Producers and users of TIH products are not without their point of view. They claim that TIH products are a small but important ingredient of our healthy economy, and that RR's have a "common carrier" obligation to ship them. Further, they are concerned that railroads need to invest more of their new-found financial resources towards "decongesting" their systems and thus reducing the risk of derailments or other incidents that might result in release of TIH. They contend that better quality control in maintenance of track & structures, a broader application of positive train control, and other operational improvements would reduce security/safety risk of rail shipping of TIH. Finally, chemical industry advocates claim that reductions in risk sought through hardening cars (carried on the shippers balance sheet) could be, without proper policies in place, wiped out if railroads try to *pocket* this reduced risk through reduced investment in track quality and train controls.

TIH rail traffic moves in pressure tank cars, a fleet of 61,600 units or, 4% of the North American railcar fleet. While nearly all pressure tank cars ship hazardous material, about one-fourth of pressure car traffic is TIH. The potential for improving safety/security through new tougher pressure tank car design standards is at a critical crossroads right now. In 2004, Congress re-established rules for improved tank car design and safety, and mandated the FRA to develop new design guidelines by February, 2007. Just last month an industry group on tank car standards got out in front of the issue with design recommendations. More importantly, about 15,000 units, almost one-fourth of the fleet will reach the maximum practical useful age (30 years) between now and 2012. This *bubble* and the Congress' call for new designs provide a one-time-only opportunity to affect a sizeable share of the fleet over a relatively short period of time.

A University of Illinois study, sponsored by rail carrier interests, found that should certain design features be imposed on new pressure car deliveries, risks due to derailment and release over the life of such a car would drop by 40%. Assuming this study is correct, imposing such standards now would result, after 6 years time, in a 10% overall risk reduction for the fleet, holding all other factors equal. Given the importance of TIH to the overall rail industry's accident & casualty record, this would not be a trivial improvement.

While debates over who pays for the *hardening* of our rail and other transportation network elements against security and safety threats can be expected to continue, they will be less likely to dangerously postpone needed risk management if we can accelerate the development of an ethic for security as well as safety. By doing so we may make the difference in securing a future of improved standards of living and our way of life. 

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