

FREIGHT DATA, FREIGHT MOBILITY; MUSINGS ON FREIGHT PLANNING & ANALYSIS, GENERALLY

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Hello & Good Afternoon. It is a pleasure to be with you today.

I am Gerald Rawling: guest lecturing a year ago, at Iowa State University, I introduced myself as one third bureaucrat, one third mad scientist, one third performing artist; well the bureaucrat retired at the end of last year so I am looking for a 1/3 persona to put in its place I suppose I'll have to write a book.

It is not my intention to talk for long ... I'll unzip a few thoughts and my wish is that it will precipitate some discussion / Q&A / further thoughts about which we can say, "Hold that thought !"

The 1/3 bureaucrat spent the last 13 years in Operations Analysis at a place called CATS, with a self-assignment in freight that confirmed my predisposition, i.e. we (CATS) looked at aspects of the operability and accessibility of freight, believing that improvements to either or both of those was in the interests of mobility. My *oeuvre* is at www.catsiatf.com [IATF = Intermodal Advisory Task Force] if that's still a live site ... time will tell if CATS' successor, CMAP (which stands for Chicago Metropolitan Agency for Planning) will keep it open so see it soon if you are interested.

If you held me to it I'm not sure I could assert that I know what is the best definition of (freight) **mobility** if it isn't actually **velocity** (and that's before we even consider reliability as a measurement around velocity). And in that elusive common ground where freight/the "public sector"/and the body politic come together, perceptions do diverge. Case in point (but not laboratory tested) an improvement expected of the CREATE project (you all know what that is, right ? – if not, see www.createprogram.org) is an increase in average train speed through the Chicago gateway from 9 mph to 14 mph ... a remarkable 56% increase which implies the ability to move about that many more trains a phenomenal statistic to the industry but just as likely to evoke an "is

that all you can do, 9 mph ?” from the underinformed public. One thing I have learned in 13 years is that there is a glaring disconnect between the *cognoscenti* and the general public which only notices freight when they’ve got something on order or when it’s standing still. It will take a lot of quality data, and more than a little improvement in comprehension, to say nothing of a major PI/PR effort, to close that disconnect.

OK, before I get lost in too much free association, let’s get some discipline.

First, recall the Chinese salutation: “may you live in interesting times ...”.

Is this an interesting time, or what ? Two weeks ago the Crosstown Expressway rose from the presumed dead, notwithstanding that today’s Crosstown is Weber Road on the cusp of Naperville and Romeoville, and in a few more years might be the Manhattan-Wilton Road , and in a few more years again could be an Illinois-Indiana truck-friendly tollway. We’ll talk more about this after the formal presentation but if you have read my paper to last year’s ITE:national you will see that this “development” (the reincarnation of the Crosstown) evokes numbers 8 and 9 of the 11 challenges I pointed out in Milwaukee. Speaking of that Milwaukee paper, summarily I was arguing that I have never found freight data to be in short supply (somebody will have them and the trick, if that is an appropriate description, is to access them) ... what is in shorter supply is regular, consistent and methodical planning and analysis that seeks to make objective sense of the data.

Now think this through - for years, the prevailing rhetorical question was, “if we build it (fill in the blank), will they come ?”. Ask the home-building industry what it thinks the answer is right now.

I suggest to you that there are two corollaries deserving of at least as much examination, namely: (1) “if we don’t build it, and they come anyway, then what ?”, and (2) “if we build it at A but they come at B, then what ?”, and this is a crucial issue since freight activity is nothing if not dynamic and mobile; UPS had a slogan “moving at the speed of business” and we adapted it to set a standard for the CATS’ Intermodal Advisory Task Force [IATF] to say “thinking at the speed of business” ... we weren’t always successful but I believe we created as much freight “buzz” as anybody short of the USDOT and the incomparable Freight Analysis Framework. You are a new audience to me so I will say what I always say about the FAF – you should be able to buy it as wallpaper at Lowe’s or Menard’s, it’s that important.

As a going away present to my former employer I wrote a major legacy paper: EYAWTKAFDFNEIBDKWIWOWMHI (something like that – think of it as my Ph.D thesis about

30 years after it was due) and I have presented one to the host here for inclusion in any Road School Proceedings (where it might outlive the www.catsiatf.com web site).

But there's not just data in that EYAWTK paper; there are several examinations of what the data might imply or how they might serve to inform.

I have always paid homage to Rudyard Kipling's "six splendid serving men", as in:

- What ? what is the action/event/behaviour that I am seeking data on
- Where ? not just a literal point in space but where in the sequence of actions/events does the action occur
- When ? not just a point in time but also a point on a continuum of actions/events
- How ? what is the process that executes the event
- Who ? is there even a live who (it could be a robot)

And lastly, the great, inescapable

- **Why ? why any of the preceding 5 ?**

You can arrange the six to suit yourself (I don't use the order Kipling originally used) but having data to provide dimension to each question allows one to think in terms of "maybe the event can be reengineered (maybe somebody else can do it differently somewhere else; maybe one or more event can be eliminated)" mobility may be one result but saving on cost will strike a chord with industry.

Keep an eye on the L.A. basin. The "driver", as they say in the industry, in southern California is AQ and the big Q for them is How ? (as in how to move the huge volume of import shipping containers off the docks) ? One answer is, "any way but the local independent drayage via I-710 that's happening now", but a consensus on the cosmic-scale technological answer (a first worldwide application of the "Beam me up, Scotty" trick, maybe ?) remains elusive.... but the queue is forming. The way I sometimes express it is this: if you are a supplier of transportation service and your equipment is slow or static then it is earning less than its potential ... and if you don't

have the income you cannot pay for the resources you are forced to consume, like clean air as the course Finals paper might ask of you: **Discuss that last sentence.**

In my EYAWTK paper there is a Box 3 (see page 47) in which I try to develop this kind of data progression and logic starting with a forecast of arriving ocean containers via southern California ports, i.e. assume a forecast to Y2020 by USDOT to be correct, though it's clearly high end; then make some assumptions about inland distribution by mode and by geography, turn that into a number of additional trains destined for the Chicago region (if I'm right, the number of additional trains by Y2020 will be a 3-digit number); then make some further assumptions about the Chicago region business model (I define the current model as: TEUs into a 'big box' warehouse, crossdock/reload from 20s/40s into 53s, and distribute supraregionally as TL by road); then estimate the trucking impact both outbound and returning - now we've got a holistic representation of a major freight ecosystem (the rail-highway interchange and *vice versa*) that all interested and responsible parties, especially Will County which is wearing the bullseye on its forehead, can debate and 'manipulate' to suit.

There is a real prospect of tens of thousands of local drays daily to and from warehouses followed by a number of TL moves (reduced by a fifth after the crossdock/reload event), also to and from warehouses it will be an emulation of I-710 which is why I said earlier, "**watch the L.A. basin**".

Changing the focus a bit: think of the implications of this next 'cause and effect' vignette - the politician & economic development director announce the creation of 300 new logistics jobs ... very laudable it's their job I applaud their success but the voice in my head says, "that could be about 1.5 million square ft. of warehousing space working two shifts, and my data base, modest as it is, suggests that implies somewhere in the order of 75,000 big truck trip productions (and an equal number of attractions) in a year, or almost 300/day, Mon.-Fri. Whose job is it to provide for them ? **Hold that thought.**

Maybe it's my English university upbringing, or my natural English bloodymindedness, but I subscribe to the "trust, but verify" school of scepticism when I was on a TRB panel examining truck weights and dimensions one proponent of increased weights was the national association of auto transporters ... I thought of 11 mid-size jeeps at 4,200 lbs. each + 10,000 lbs for the tractor + 7,500 lbs. tare weight for the rig, and I got 63,700 lbs., well short of max. allowable weight. Something doesn't compute (and it could be me).

I mentioned a moment ago the ITE:national 2006. I brought up there 11 issues/challenges and I still will argue that together they represent a logic framework for freight data management – at least at the regional level where I worked. It (the framework) is based on my belief that for the freight industry data is not an abstraction, it is always related in some way to a “cause and effect” relationship (I am a disciple of/convert to cause and effect) and it is almost always related to “taking cost out of the activity” if I were responding to the NPRM on Projects of National & Regional Significance I might say “if it (the proposed project) doesn’t take a measurable cost out of some clearly-defined activity then don’t do it”. **Hold that thought.**

It is my view that subjects such as mobility, capacity, productivity (and the latest attribute:agility) are dynamic, and abstruse; I wish I had had more opportunity to develop those issues. In the EYAWTK paper several “arguments” (if that’s the right word) are developed, namely:

1. The Union Pacific RR has stated that a loss of 1 mph in systemwide velocity (I’m not sure what mobility is to a railroad) translates into a requirement for 250 added locomotives, 180 crew persons, 5,000 more railcars and 50 miles of new track. I estimate that costs \$ 75 million/year (annualised, and based on varying life expectancies), which could be a significant drag on retained earnings
2. If any major railroad has to add 180 crew persons, how many persons must it interview/“process” to achieve that target ? Ans. 3,600 approx., because half fail the drug&alcohol test, half after that initial cull will fail the literacy test, then half of the remainder fail the “practical” (i.e. they are considered unsuitable to be practicing train crew). The pool is now down to 450, and more than half of those will have decided within the first year that the work schedule is too demanding (i.e. it creates lifestyle issues – here not used in the shallow tabloid sense of a style/habit choice, but as a measure of time and space management under competing family demands)
3. If you work your way through the TTI congestion report and make certain assumptions about length of work day for a “typical” truck in metropolitan Chicago, and set a rate that values a working truck-hour at \$65, then a “typical” truck working in metropolitan Chicago incurs an involuntary cost of \$ 3,700/year attributable to congestion. If you assume that every one of the 36,000 trucks that daily cross the state line between Illinois and Indiana incurs this level of involuntary cost then that sums to about \$ 133 million a year
4. In the annual State of Logistics report by the CSCMP (I think of it as one of the “big 5” annuals, which are the ATA, the AAR, the TTI, the ASCE and the CSCMP) you can read that business inventories increased each year from 2001-2004 and

in 2004 were 26% greater than in 2001 one cause of business inventory is immobility – if inventory in motion is slow and unreliable it requires more of it to meet service standards. If you think about this for a minute it is a disturbing statistic, if unsurprising, because it indicates a creeping dysfunction in the supply chain. “Hold that thought”.

Let’s agree that should be enough for this presentation to start a dialog. My last mantra, taken from the EYAWTK paper* is this: it is not my style to present data with the statement, “this is the inarguable truth, accept it” but with the qualifier, “this is the intel. I have been able to acquire and organize; make what you can of it, but most of all, if you know better than me, tell me, because I can learn”. And that’s the appeal I make to you today, as in “tell me something I don’t know” (said genuinely and not in the populist sarcastic version).

Again, I express my thanks to all of you for the invitation to Road School 2007.

** Everything You Always Wanted to Know About Freight Data for northeast Illinois but Didn't Know
Where it Was or Who Might Have It*

After the close of the session there was a lively discussion. Several issues were brought out by the audience; these included:

- What opportunity is there for diurnal redistribution of freight activity, especially into the evening and night hours (and FedEx air freight was cited) ? My response was that FedEx trucks work all day to collect and distribute the freight that is the payload for the plane that flies at night. I also noted that an examination of diurnal distribution of truck activity will reveal a very normal distribution with a single midday (approx.) peak of 8-9%, and 2-3% each hour during evening and night hours (e.g. grocery store resupply is 24/5 if not actually 24/7) – the opportunity to do more in evening and night hours is dependent on the ability and willingness of

shippers and consignees to dispatch or receive freight, at a cost to them, at least as much as it is dependent on the truckers' disposition.

- What is the likely timetable for a transcontinental rail merger ? My response was that I thought it not very likely in view of the fact that something like 40% of today's traffic could be considered "captive" and a transcon. would increase that percentage ... I would expect some high volume shippers to resist it. I proffered a radical alternative if overall rail capacity is not hugely increased, and if the number of trains increases significantly (refer to discussion in the presentation re: projected number of trains resulting from import of shipping containers) then train "paths" become scarce (demand outpaces supply and the price for one goes up steeply), at which point it is not out of the question that a global logistics company such as China Shipping or Evergreen might buy a railroad in order to secure paths for its own traffic (under such a scenario it is not fantastical to imagine a global logistics company retaining what was the Santa Fe "racetrack"/transcon route and putting the rest of the BNSF "in play") .
- Where could the money come from to invest in rail capacity, given that the railroads are currently using their own money to invest extensively ? My comment was that the answer is contained in the question, in that the railroads use some of their retained earnings [Keith Bucklew had earlier noted that the railroad industry is several times more capital intensive than industry in general]; if the railroads can increase retained earnings (either by increasing income or retaining a greater share) they can reasonably be expected to invest more. I referred to a section of the "legacy" paper/CD, the EYAWTK (Everything You Always Wanted To Know *) on exhibit in the session [see page 48 of same] in which a trucking company CEO discusses the value of intermodal, and his company's plans to "do" more intermodal ; I suggested this indicates the "revolution" in/conversion to intermodal is continuing. I also spoke in principal in favour of the tax credit concept for infrastructure investment and suggested it could be applied to/considered for parties, including third parties, in addition to railroads. I also made the point that thinking outside the box, to which many pay lip service, is essential. I offered the example of "differentiated lanes", i.e. one devoted to trucks and the balance as general purpose (but non-truck) lanes, and asked, "do we know how much less expensive is a general purpose lane to construct and amortise (how much cost could be saved) ? ". It's not so much that the precise answer matters, as that the question should be asked.

And, while it did not take place at Road School 2007 but because it is an important message, I attach a recent speech by Gil Carmichael: [Intermodalism – A New Science of Transportation](#)

INTERMODALISM
A NEW SCIENCE OF TRANSPORTATION

Speech Delivered by
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United States Federal Railroad Administrator, 1989-1993

"THE TRANSPORTATION TABLE"

WASHINGTON, D.C.

March 23, 2007

GIL CARMICHAEL, SPEECH TO THE "TRANSPORTATION TABLE", WASHINGTON, D.C., MARCH 23, 2007

On most occasions when I speak about intermodal transportation, I devote an extensive portion of my remarks simply to provide a basic orientation. This audience does not require such coddling. You all grasp the fundamentals. Many of you are experts.

You understand that freight transportation has undergone a revolution during the past quarter-century and that intermodal is now the global standard for moving freight. You also understand how it succeeds---interconnections...containerization...speed...safety...reliable scheduling...economic and fuel efficiency...and marshalling the strengths of each individual mode, while avoiding modal weaknesses. We are looking at a new science of transportation.

Yes---this intermodal system works. It continues to grow. Its future success will hinge partly upon our ability to further improve the routes and terminals which enable it to function in the manner desired. However, although a revolution in freight transportation has taken place, the general public is unaware of it. Most public officials and opinion leaders don't even know the intermodal system exists! It may be unreasonable to think that the average citizen will get excited about such matters, but ignorance on the part of our public officials and opinion leaders has consequences! Ignorance about transportation in general...and intermodal in particular...has placed government at all levels "well behind the curve" in thinking and acting on a wide range of transportation issues. During our intermodal revolution they sat on the sidelines for 25 years.

By tradition government agencies concentrate on each mode's infrastructure. Highway agencies build and maintain roads. Airport authorities build and maintain airports. Government provides grants to these and other systems---urban transit and Amtrak, for example---to offset operating deficits, meet capital needs, and help upgrade the infrastructure they use. Several things are wrong with this historical arrangement.

For one thing it leads to one-dimensional thinking. Federal and state governments concentrate on infrastructure, but don't pay much attention to how it is actually used—or where the most promising opportunities exist. Freight's intermodal network, on the other hand, has succeeded because it is customer-driven. Our

“infrastructure mentality” also causes government to view the modes in isolation, yet the intermodal system prospers by efficiently unifying them horizontally.

Among public officials at all levels of government---including many people in transportation agencies---the ignorance of freight transportation is almost universal. Some regional planning agencies have written transportation plans which devote more attention to bicycle paths than to freight transportation. We must remember that for every passenger moving on America’s transportation system, a ton of freight is moving.

Ignorance about freight leads to bad decisions and missed opportunities. Nearly all recent progress and innovation in U.S. transportation has come in the freight area. Nearly all of those gains are attributable to action and investment by the private sector--not government. I believe that freight will continue to be the category in which we achieve the most impressive gains. The ship, train and truck have found each other!

Unfortunately, government is heavily involved in passenger policy. Government has resisted reform and modernization. We desperately need an intermodal systems approach to passenger service. In this regard we are 20 years behind the freight industry. The plane, train, and intercity bus must find each other!

Finally this obsolete focus on individual modes and individual modal infrastructure, coupled with a lack of knowledge about customers and markets, causes important issues to fall through the cracks because they don’t have a governmental “home.” The most striking example is the intercity bus industry. We are losing it. Most people don’t care. They should. It frankly amazes me that a mayor will loudly protest the threatened loss of airline services or a single Amtrak train to his or her community. Yet the disappearance of intercity bus service---which may have generated more local ridership---is allowed to take place without comment or complaint. Greyhound is almost invisible today.

As commercial air service continues its retreat from urban areas of less than 100,000 population, people will still have to get to major airports---only the terminals will be farther away. The choice is simple---bus or private car. The bus is flexible. Routes can be adjusted as markets change. Service frequency can be increased or decreased depending upon demand, and at modest cost. Despite these advantages, the intercity bus industry is in trouble. Government...at every level...simply doesn’t care.

There are two issues currently up for consideration which relate to the intermodal theme. One is the proposed 25 percent tax credit for freight railroad capital investment. Intermodal's biggest challenge is simply that of capacity expansion. I believe that the freight railroads have done a good job funding improvements that add capacity and enhance intermodal service. Capital investments that directly influence these two priorities currently are running in the \$5-8 billion annual range. Meeting even predictable near-term business growth will require a much higher commitment.

A tax credit will unleash substantial additional amounts on an ongoing basis. I urge support for it. The huge North American rail system has been single-tracked in the last 30 years. This right-of-way is probably carrying only 25 percent of its capacity. If we go back to double-or-triple-tracking, grade separation, and GPS, it would equal three times more capacity---and this right-of-way already is in place and paid for! If we build this Interstate II it will be far more significant than Interstate I was.

Senators Lott and Lautenberg are working on a multi-billion-dollar Amtrak reauthorization proposal which includes incentives for states to provide matching funds. I believe that we will have to involve the states more deeply in issues associated with intercity rail passenger service. There is overlap with the states' other transportation functions, and there is an overlap with freight's intermodal system. How public officials deal with specific passenger projects can help create a better intermodal system---or damage the existing one. States might wisely partner with the railroads to add a third track. This may be the real public-private partnership we keep talking about.

In considering Amtrak, I am aware of the deferred capital needs of the Northeast Corridor, \$20 billion in 2002, and rolling stock system-wide. However, I would urge that in considering any new routes or services, only one priority should be applied. That is to upgrade the most promising existing city-pair corridors by first increasing train frequencies, and improve schedule times within the framework of conventional intercity service, In time I believe we will need to expand high-speed routes. But in nearly all cases we will need to develop and build a customer base with more frequencies before making the leap to a true high-speed operations. The 13 federal designated corridors are a good place to start for the city pairs.

Perhaps the most important next step in advancing intermodal transportation, both freight and passenger is to take a fresh look at the structure and priorities of government agencies. I've noted that since 1980 freight intermodal has flourished because the private sector was in charge. Some would claim that government involvement easily could have retarded its growth. But I do believe that government has a role in freight, if for no reason other than the linkages among the surface modes and connections at public ports, terminals, and the new evolving "logistics centers." I don't believe that meaningful progress can be achieved in passenger intermodalism unless state transportation departments are the catalyst for it!

Why the states? Who else will do it? Theoretically the airlines might be promoters of improved surface connections to deliver passengers to their gates---but they operate at airports they don't own! Today those airport managers have shown little interest in anything but "parking lot" and "car rental" revenues. Nearly all efforts by intercity bus companies to provide direct service, or to be allowed to maintain facilities on airport terminal grounds have been summarily rebuffed. The bus companies can't do it. Name me one major airport with a Greyhound station.

Amtrak isn't in a leadership position to be a broker or coordinator, and its management lacks the skill, vision, and entrepreneurial spirit required to bring it off. It seems so logical that the airplane should meet the bus and train ---by design. Just as it does at Hong Kong, Charles de Gaulle, Narita, Japan.

To prepare public agencies for a belated arrival into the intermodal era I propose that the chief executive of each state transportation department should have two principal deputies---one to oversee policies and programs associated with freight transportation and the other to carry out an identical role in passenger transportation. Each could be meaningful players in coordination and intermodal project design and approval. They would soon learn that they have to listen to the customers.

Senior executives of these agencies should have a working knowledge of the new principles of intermodal transportation, because a majority of policy decisions and projects need to be carried out with priority given to intermodal needs---for both freight and passenger improvements. Senior DOT executives either should have gained this intermodal knowledge through professional experience in the transportation industry or they should receive formal academic training. That's what the Intermodal

Transportation Institute at the University of Denver is doing through its Executive Master's Degree: "Graduate School of Intermodal Studies"

Dividing the executive functions---policy...planning...programs...and grants--- into the freight and passenger categories makes practical sense. It also would make a powerful statement that we in fact do understand that the world has changed.

What about the federal government? Congress still operates as if this were the 1950s. Members talk intermodal but vote for traditional highway projects. I hold out little hope for leadership from Capitol Hill. What about USDOT? Fifteen years ago they created an intermodal office. It had no authority. It was purely cosmetic. Eventually it was done away with. A senior official of the department told me several weeks ago that steps now have been taken to bring a serious intermodal flavor to its policies and actions, by concentrating on freight. I am not hung up on that point, because I realize that formal changes affect such things as congressional committee relationships. Even the chairs of the most insignificant subcommittees rebel if even half a smidgen of their turf is threatened. I recognize the difficulty of a formal reorganization of Congress but a committee on intermodal freight and one on intermodal passenger make sense.

But if my friends at DOT are serious about this, I ask them to show us tangible evidence. They won't have credibility until they do. A chart with dotted lines showing coordination arrangements won't convince us. Even having an intermodal "enforcer" who can mandate coordination won't suffice. We in the intermodal community will believe you only when we see solid evidence that your FAA, FRA, Highway, and UMTA leaders are energetic intermodal advocates---without pressure from above. Further, I propose that DOT informally gather the best minds of the intermodal community to examine what they are up to. That could help persuade us. It also could help DOT avoid going in the wrong direction in the process trying to do something right. Congestion is reaching critical mass---the huge untapped capacity of North American Railroad right-of-way may be the solution! We must change directions.

I've reached the closing portion of my remarks without mentioning the subject of energy. I happen to believe that high fuel prices are with us for the long term and that they will go even higher! But it doesn't matter what I think, when the subject is intermodal. Why? Intermodal made sense when fuel cost one-half of today's price.

Intermodal makes even more sense today. If prices drop, the container will still be the low-cost service. It made Wal-Mart.

If energy costs double in the years ahead, intermodal will simply gain more market share and help keep inflation under control.

There's a lesson here for politicians who are jumping on the energy bandwagon. Investment in intermodal is a no-brainer if you want to conserve fuel and keep the cost of goods and services in line, even if we radically reprice fuel as we have. And it has a built-in hedging mechanism, because intermodal investments will pay off even if prices decline. If fuel cells work, I expect both truck and rail to adopt the technology. The intermodal marketplace won't be skewed because energy costs are only one component of the intermodal advantage.

However, I would observe that railroads do have a trump card. Unlike their partners in trucking and aviation, if at some point in the future permanent oil shortages are a serious threat, rail can convert to electricity generated from an alternate source. The rail mode already carries its freight and passengers nine times farther per gallon of fuel than do the highway modes.

Thank you.